THE IRON TRADE REVIEW

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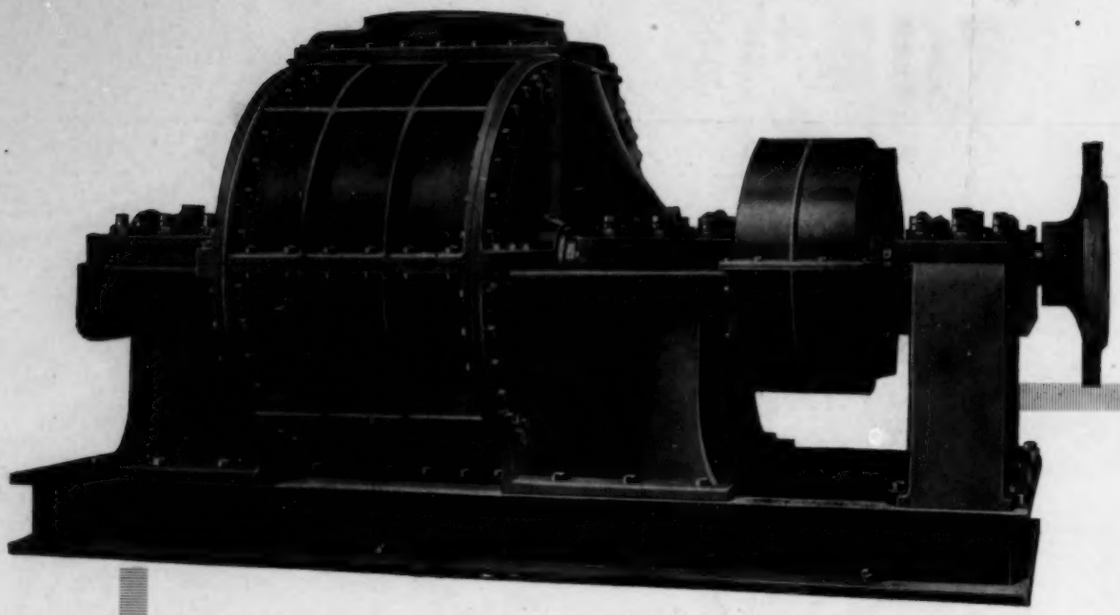

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NEW YORK
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THE IRON TRADE REVIEW

Vol. LXII Cleveland, May 30, 1918 *No. 22*

Increased Costs Become Real Factor

Addition of $1 to $1.50 Per Ton to Pig Iron Through New Freight Advances May Have Weight in Price Deliberations—Remaining Commodity Rates Attacked—Pittsburgh May Get Federal Fabricating Plant

PROSPECTIVE high scale additions to profit taxes and to freight rates on raw materials are forcing a new reckoning with the cost factor in iron and steel. The advances of 25 per cent in freight rates, effective June 25, taken in conjunction with the recent 15 per cent advance and the April wage increase, promise to exercise an influence upon the quarterly adjustment of iron and steel prices which is scheduled to come up about that time. By the new tariffs, iron ore will be raised flatly 30 cents per ton, coke from 15 to 75 cents, and coal from 15 to 50 cents, depending on the present rate. Pig iron costs accordingly will be elevated from 75 cents to $1 a ton in the more favored locations, and from $1.25 to $1.50 in the more remote districts. Joined with the general advance is another freight proposal of the railroads to practically wipe out the remaining iron and steel commodity rates in central freight association territory by putting them on the class or mileage basis. It is highly interesting that the ground advanced for this movement is that competition between the railroads, which created the commodity rates, no longer exists.

Steel Survey is Lagging

Light apparently is not to be shed on the government's exact requirements of iron and steel for the conduct of the war. A joint committee of iron and steel producers and representatives of the war industries board which has been making a survey of the situation has met with difficulties that raise doubt whether it will be able to carry out its original aims. Certain of the government departments, it would seem, are unwilling to give a frank statement of their needs on the ground of military caution, or are unable to measure their own requirements because of the day-to-day changes. As the results of the proposed survey were to go far in determining whether there is to be any steel for an open market, that question must remain a subject of divergent opinion. The war industries board in an official statement of policy dissipates the idea that any formal classification of nonessential industries is to be attempted. Rather readjustment is to be effected through the priority regulation of raw materials, so that designated purposes shall be served first. Since it is declared the basic supplies in various lines will be practically exhausted by the government needs, the final result for nonwar industry will be the same.

Big war undertakings continues to mature. It is reported that Pittsburgh will secure the proposed government plant to fabricate ship material. Greater demands for shell steel upon the home mills will result because circumstances have brought it about that France no longer is able to supply the American expeditionary forces with such material.

Much Iron is Allocated

Shortage of basic and low phosphorus iron is reflected in the heavy tonnage allocated in the week for various consumers who are producing essential lines. The basic involved was about 25,000 tons and the low phosphorus about 10,000 tons. Owing to the numerous buyers of iron who have not been able to cover themselves fully for the last half, it is thought the government will be obliged more freely to procure tonnage for essential work as midyear approaches. In the meantime, the checking up by the furnaces of present uses of iron by the consumer is going ahead. Slowness of returns in some districts, notably in the east, has inspired a fear that the questionnaires may not bring out the desired information.

Gray iron plants will be helped considerably by the substitution of their product for malleable iron in hand grenades now being made by the war department which bears out the previously published statements. Shops now making malleable grenades, if so equipped, will complete their orders in the new form; if not, they will drop out of this production. The ordnance department has decided, however, that the making of malleable rifle grenades will continue.

MAY 30, 1918

THE IRON TRADE REVIEW

A weekly publication devoted to the Iron, Steel, Foundry and Metalworking Industries.

Published Every Thursday by
THE PENTON PUBLISHING CO., Cleveland

BRANCH OFFICES

CHICAGO - - - - - 1147 Peoples Gas Bldg.
CINCINNATI - - - - - - 128 Opera Place
NEW YORK - - - - - - 508 West St. Bldg.
PHILADELPHIA - - - 1316 Land Title Bldg.
PITTSBURGH - - - - 2148-49 Oliver Bldg.
WASHINGTON, D. C. - - - 40 Metzerott Bldg.
BIRMINGHAM, ENG. - - - Prince's Chambers

Subscription, United States and Mexico, $4 per year. Canada, $6, and other Foreign Countries, $8 per year.

Entered at the Postoffice at Cleveland as Second Class Matter

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What Happened to One Prediction

THE relative merits of the steel or wood shipbuilding programs have held little interest for the general public for months past. Barely a year ago, the question was occupying almost the most prominent position in the public discussion of war problems. The intervening 12 months have solidified the sentiment in favor of any and all kinds of ships as a stop gap for the submarine depredations. Steel manufacturers now can look back to the forgotten controversy with the satisfaction of knowing that they have more than held up their part.

Last spring, Mr. Denman, former shipping board chairman, pointed out that "the supply of skilled steelworkers is limited. When it became apparent that the building of merchant ships would be delayed on that account, the board started work on its plan of standardizing wooden construction." By Oct. 1, last year, he predicted we would be turning out wooden ships at the rate of 200,000 tons a month. By today, 800 to 1000 such ships would be in commission.

Several weeks ago the first completed wooden ship ordered by the government started on its maiden trip. The program is beginning to bear fruit now, but hardly in the roseate way predicted by Mr. Denman. Launchings are approximating a ship a day and the growing fleet of these useful carriers will soon be an important influence in our maritime trades, particularly in coastwise service.

The steel shipbuilders, however, are rapidly approaching the mark set by Mr. Denman as certain of attainment with wooden ships, but impossible for steel. Deliveries in the first 23 days of May numbered 29 steel ships of 175,000 deadweight tons. For the full month, the figures should run well over 200,000 tons. This record, of course, is aside from the heavy construction work for the navy department which has engaged practically the full capacity of most of the old, established steel shipyards.

The burdens of the war program have proved heavier than anyone in the steel industry anticipated. In the record of steel ship construction, tangible proofs are being presented daily to show how the steel industry is meeting these unexpected drafts on its productive capacity.

Putting His Plant on Record

CONSIDERABLE progress is being made in the collection of data by the individual furnaces showing the extent to which their customers are requiring pig iron to fill direct and indirect war orders dating from May 1. The statistical survey of the consuming side of the industry is being made in behalf of the committee on pig iron, iron ore and lake transportation of the American Iron and Steel institute, which in turn is acting as the representative of Steel Director Replogle. This is necessary before the pig iron industry may be put on a war footing and systematic distribution be inaugurated which will insure a steady supply of metal where the government needs it most. The exhaustive and detailed character of the investigation makes it probable that it will require weeks before all figures can be compiled.

Sufficient progress has been made, however, to disclose some interesting facts. The proportion of war business has been larger with the eastern than with the western plants, but it apparently has been increasing with the latter. The steel plants, as was to be expected, are more fully engaged than the foundries. Nevertheless, some of the latter make a showing only slightly inferior and curiously many of them have been reporting a larger amount of indirect war business. It is to be noted from the partial returns so far received that the larger part of the so-called essential work which both the foundries and steel works are performing is of the indirect class.

A large middle western furnace interest, on partially-complete returns to date, found that its consumers of gray iron had 63 per cent of their capacity on indirect war work and only 11 per cent on direct. The division of work showed 2 per cent direct and 4 per cent indirect for Emergency Fleet corporation; 2 direct and 2 indirect for the navy; 3 direct and 10 indirect for the army; 1 direct and 1 indirect for

the allies; 3 direct and 1 indirect for the railroads; and nothing direct and 2 indirect for government work. The remainder was made up of 29 per cent for agricultural castings, 1 for mine supplies and 15 for machine tools. The same interest found it was furnishing malleable and basic at the rate of 15 per cent direct and 67 per cent indirect, or 82 per cent in all. The greatest portion of the work was for the army with 2 per cent direct and 19 indirect, and for the railroads with 9 per cent direct and 10 per cent indirect. Agricultural implement business was absorbing 9 per cent.

Another furnace company serving a more eastern district found that 18 per cent of the capacity of the gray iron foundries which reported was on direct war work and 58 per cent on indirect. The division was 2 per cent direct and 3 per cent indirect for Emergency Fleet corporation; nothing direct and 4 indirect for the navy; 3 direct and 19 indirect for the army; nothing direct and 2 indirect for allies; 12 direct and 2 indirect for the railroads; 5 for agricultural implements, 8 for mine supplies and 7 for machine tools. The malleable and basic grades of this producer were being used at the rate of 15 per cent direct and 71 per cent indirect. The largest factors were 10 per cent direct and 14 per cent indirect for the war department and 18 per cent indirect for the allies. Agricultural implement demands were 6 per cent.

It is manifest from the data so far compiled that the report now being returned by the average consumer of iron will represent his silent pleader at court. Without a return his status both as a possible producer of war material or as a consumer of iron of the preferential class will be in doubt. The government is determined that essential production shall be carried to its highest point. This means both the full utilization of all available capacity and the furnishing of enough raw material to make this maximum output possible. Other work must stand aside. It is manifest from every standpoint that the best insurance a consumer of iron can have today is to put his plant on record. Really he has no alternative if he would safeguard the future of his business.

The Foundryman's War Problem

PRELIMINARY figures compiled from the survey of pig iron consumption now being conducted by the subcommittee on iron ore, pig iron and lake transportation of the American Iron and Steel institute, indicates that roughly 40 per cent of the gray iron and malleable foundry output of the country falls within the nonessential classification. It is self-evident that an extensive readjustment of the foundry production is in order, in view of the shortage of pig iron for war work. The production of so-called nonessential articles of cast iron will not be entirely eliminated, but it is almost certain to be greatly curtailed. To the individual foundryman, with only a small percentage of essential war work on his books, the problem is one which will not admit of temporizing, since in these days of high prices and resultant high overhead expenses, output cannot be permitted to fall below a certain figure without serious results.

Thousands of foundrymen, therefore, must answer the question, "What kind of work must I obtain in order to be certain that my production will not be seriously curtailed?" It is true that during the past year there have not been many opportunities for either gray-iron or malleable foundrymen to engage in direct war production, but as our military plans expand this situation will change and already there are numerous avenues of opportunity open which were not evident even a few months ago. For instance, the greatly enlarged shipbuilding program will call for a vastly increased tonnage of gray-iron castings for ship-propulsion machinery of all sorts, including steam turbines, reciprocating engines, pumps, condensers, etc.

The various malleable interests of the country have less opportunity in the marine field, but with the great railroad car-building program in full swing, a substantial portion of their capacity is destined to be absorbed on essential production. Also, it is still felt in well-informed circles that on account of the congested condition of the steel foundries, the government must eventually turn to the malleable-casting industry for a sufficient output of military truck wheels. Malleable-iron wagon fittings and saddlery hardware also form another outlet.

Turning again to the gray-iron shops, we find the whole field of grenades, trench-mortar shells and light artillery shells opening up. It is now probable, the gray-iron plants will be called upon to turn out a large proportion of the hand grenades formerly made in the malleable foundries. Contracts for 500,000 gray-iron Newton-Stokes trench-mortar shells already have been let to gray-iron shops. Extensive experiments on other forms of cast semi-steel shells are under way.

On a large proportion of this work, including both marine castings and projectiles, a high order of technical ability is necessary to achieve satisfactory results. Nearly a year ago Major Edgar Allen Custer pointed out that to meet the requirements of shell manufacture, the foundry must be run on a strictly scientific basin. "There can be no guesswork or slipshod methods," he stated, adding that it was doubtful if at that time there was a single foundry in the United States that could qualify at once for shell work without material changes in procedure. This latter prophecy has since been fulfilled. The requirements of essential war production are extremely rigid. Many foundrymen, therefore, are face to face not only with the necessity of seeking new lines of work, but of vastly improving their practice. These changes can and must be accomplished, in order that our casting plants may properly support our fighting men in the front line in France.

Iron and Steel Prices

Corrected to Wednesday Noon

SCRAP, WAREHOUSE AND IRON ORE PRICES ON PAGE 1404

PIG IRON

Bessemer, valley	$35.20
Bessemer, Pittsburgh	36.30
Basic, Pittsburgh	33.10
Basic, eastern Pa.	32.00
Basic, Buffalo	32.00
Malleable, Pittsburgh	34.60
Malleable, Chicago	33.50
Malleable, Philadelphia	34.00 to 37.50
Malleable, Buffalo	33.50

GOVERNMENT SCHEDULE

1.75 to 2.25 silicon (No. 2 foundry, No. 2 plain, and No. 3 southern), $33 furnace base.

2.25 to 2.75 silicon (No. 2X, No. 1 Northern foundry, and No. 2 southern), base plus 50c.

2.75 to 3.25 silicon (No. 1X, No. 2, soft), base plus $1.50.

Over 3.25 silicon, $34.50, plus $1.00 for each ½ per cent of silicon.

No. 1X, Phila.	35.25 to 35.50
No. 2 foundry, Pittsburgh	34.10
No. 2 foundry, Cleveland	34.10
No. 2 foundry, Ironton	33.00
No. 1 foundry, Chicago	33.50
No. 2 foundry, Chicago	33.00
No. 2X foundry, Phila.	34.25 to 34.50
No. 2X foundry, N. J. tide	34.25 to 34.50
No. 2X foundry, Buffalo	33.50
No. 2 plain, Philadelphia	33.75 to 34.00
No. 2 plain, N. J. tide	33.75 to 34.00
No. 2 southern Birmingham	33.00 to 33.50
No. 2 southern, Cincinnati	36.40
No. 2 southern, Chicago	37.50
No. 2 southern, Phila. del.	38.30 to 39.40
No. 2 southern, Cleveland	37.50
No. 2 southern, Boston	39.50
No. 2 southern, St. Louis	35.90
Virginia, No. 2X, furnace	33.50
Virginia, No. 2X, Phila.	36.77
Virginia, No. 2X, Jersey City	37.02
Virginia, No. 2X, Boston	37.27
Gray forge, Pittsburgh	32.95
Silveries, 8 per cent, furnace	45.50
Silveries, 8 per cent, Chicago	48.50
Low phos. standard, Phila.	55.00 to 56.00
Low phos., Lebanon, furnace	50.00 to 52.00
Low phos., Pittsburgh	53.00
Charcoal, Superior, Chicago	37.50
Charcoal, Superior, Buffalo	39.75
Charcoal, southern to 2 per cent silicon	43.00

COKE

(At the ovens)

Connellsville furnace	$6.00
Connellsville foundry	7.00
Pocahontas furnace	8.00
Pocahontas foundry	8.00
New River foundry	8.00
New River furnace	8.00
Wise county furnace	6.00
Wise county foundry	7.00

FERROALLOYS

Ferromanganese, 80 per cent delivered	$290.00
Ferromanganese, 70 per cent delivered	250.00
Spiegel, 16 per cent fur., spot	75.00 to 77.00
Spiegel, contracts, furnace	75.00
Ferrocarbon titanium, carloads, maker's plant	200.00
Ferrosilicon, 50 per cent, second quarter, Pitts.	150.00 to 160.00
Ferrosilicon, 50 per cent, Pitts., remainder of 1918	150.00 to 160.00
Bessemer ferrosilicon, 10 per cent.	55.00
Bessemer ferrosilicon, 11 per cent.	58.30
Bessemer ferrosilicon, 12 per cent.	61.60

Ferrosilicon prices at Ashland, Ky., Jackson and New Straitsville, O.

SEMIFINISHED MATERIAL

BILLETS AND BLOOMS

Open-hearth, Pittsburgh	$47.50
Open-hearth, Philadelphia	50.50
Open-hearth, Youngstown	47.50
Bessemer, Pittsburgh	47.50
Bessemer, Youngstown	47.50
Forging, Pittsburgh	60.00
Forging, Philadelphia	63.00

SHEET BARS

Open-hearth, Pittsburgh	$51.00
Open-hearth, Youngstown	51.00
Bessemer, Pittsburgh	51.00
Bessemer, Youngstown	51.00

SLABS

Pittsburgh and Youngstown.	$50.00

WIRE RODS AND SKELP

Wire rods, Pittsburgh	$57.00
Grooved skelp, Pittsburgh	2.90c
Sheared skelp, Pittsburgh	3.25c

SHAPES, PLATES AND BARS

(In cents per pound)

Structural shapes, Pitts.	3.00c
Structural shapes, Phila.	3.185c
Structural shapes, N. Y.	3.195c
Structural shapes, Chgo.	3.00c
Tank plates, Chicago	3.25c
Tank plates, Pittsburgh	3.25c
Tank plates, Philadelphia	3.435c
Tank plates, New York	3.445c
Bars, soft steel, Pittsburgh	2.90c
Bars, soft steel, Chicago	2.90c
Bars, soft steel, New York	3.095c
Bars, soft steel, Phila.	3.085c
Bar iron, Chicago	3.50c
Bar iron, Phila.	3.50c to 3.685c
Bar iron, Cleveland	3.64c to 3.70c
Bar iron, New York	3.50c to 3.695c
Bar iron, Pittsburgh	3.50c
Hard steel bars, Chicago	3.00c

RAILS, TRACK MATERIAL

Angle bars, Pittsburgh base.	3.25c
Angle bars, Chicago base	3.25c
Standard bessemer rails, mill	$55.00
Stand. open-hearth rails, mill	57.00
Light rails, 25 to 45, mill	3.00c
Relaying rails, light, St. L.	60.00 to 67.00
Spikes, railroad, Pitts.	3.90c
Track bolts, Pittsburgh	4.90c
Track bolts, Chicago	5.115c
Tie plates, Chicago	3.25c

WIRE PRODUCTS

(Per 100 lbs. to jobbers; retailers 5c more)

Wire nails, Pittsburgh	$3.50
Coated nails, Pittsburgh	3.45
Plain wire, Pittsburgh	3.25
Galvanized wire, Pittsburgh	3.95
Polished staples, Pittsburgh	3.65
Galvanized staples, Pbgh.	4.35
Barb wire, painted, Pitts.	3.65
Barb wire, galvanized, Pitts.	4.35
Cut nails, Pittsburgh	4.00

CHAIN, PILING, STRIP STEEL

(In cents per pound)

Chain, ⅜ in. proof coil, Pitts.	8.00c
Sheet piling, base, Pitts.	4.00c to 5.00c

Cold rolled strip steel, hard coils, 1½ inches and wider by 0.100 inch and heavier, base per 100 pounds, 6.50c.

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SHEETS

(In cents per pound)

SHEET MILL BLACK

No. 28, open-hearth, Pitts.	5.00c
No. 28, bessemer, Pitts.	5.00c
No. 28, open-hearth, Chi.	5.215c

TIN MILL BLACK

No. 28, open-hearth, Pitts.	5.00c
No. 28, bessemer, Pitts.	5.00c

GALVANIZED

No. 28, open-hearth, Pitts.	6.25c
No. 28, bessemer, Pitts.	6.25c
No. 28, open-hearth, Chi.	6.465c

BLUE ANNEALED

No. 10, open-hearth, Pitts.	4.25c
No. 10, bessemer, Pitts.	4.25c
No. 10, open-hearth, Chi.	4.465c
No. 10, open-hearth, Phila.	4.435c

TIN PLATE

(Per 100 lb. box)

Tin plate, coke base, Pitts.	$7.75

IRON AND STEEL PIPE

Base Pittsburgh

Base Pittsburgh	Black Per cent off	Galv. Per cent off
⅛ to 3 in., butt, steel	51	37½
¼ to 3 in., butt, iron	33	17

BOILER TUBES

Steel, 3½ to 4½ inches, l. c. l.	30
Iron, 3½ to 4½ inches, c. l.	12½

CAST IRON WATER PIPE

(Class B Pipe)

Class A pipe is $1 higher than Class B.

Four-inch, Chicago	63.35
Six-inch and over, Chicago	60.35
Four-inch, New York	64.35
Six-inch and over, N. Y.	61.35
Four-inch, Birmingham	58.00
Six-in. and over, Birmingham	55.00

HOOPS, BANDS, SHAFTING

Hoops, Pittsburgh	3.50c
Bands, Pittsburgh	3.50c
Hot rolled strip steel, Pitts.	3.50c
Shafting, Pitts., carloads	17 off to list
Cotton ties, May, per bundle	$1.91

RIVETS

Structural rivets, Pittsburgh.	4.40c
Boiler rivets, Pittsburgh	4.50c
Rivets ⅞ in. & small., Pitts.	50 and 10 off

NUTS AND BOLTS

(Delivered within 20-cent freight radius)

CARRIAGE BOLTS

(⅜ x 6 inches, smaller and shorter)

Rolled thread	50–5 off
Cut thread	40–10–5 off
Larger and longer	40 off

MACHINE BOLTS

(⅜ x 4 inches, hot pressed nuts)

Rolled thread	50–10–5 off
Cut thread	50–5 off
Larger and longer	40–10 off
Cold pressed semifinished hexagon nuts ⅜ in. and larger	60–10–10 off
Cold pressed semifinished hexagon nuts ⅞ in. and smaller	70–5 off
Gimlet and cone point lag screws	50–10 off

NUTS

Hot pressed, square blank	2.50c off
Hot pressed, square tapped	2.30c off
Hot pressed, hexagon blank	2.30c off
Hot pressed, hexagon tapped	2.10c off
Cold pressed, square blank	2.25c off
Cold pressed, square tapped	2.00c off
Cold pressed, hexagon blank	2.25c off
Cold pressed, hexagon tapped	2.00c off

Prices Present and Past

(Yesterday, a month ago, three months ago and a year ago)

Quotation on leading products May 29, average for April, 1918, average for February, 1918, and average for May, 1917. Prices are those ruling in the largest percentage of sales at the dates named.

	Prices May 29, 1918	Average prices April, 1918	Feb., 1918	May, 1917
Bessemer pig iron, Pittsburgh	$36.30	$36.15	$37.25	$44.95
Basic pig iron, Pittsburgh	33.10	32.95	33.95	42.15
*No. 2 Foundry pig iron, Pitts.	34.10	33.95	33.95	43.55
*No. 2, Foundry pig iron, Chi.	33.00	33.00	33.00	43.20
Lake Superior charcoal, Chicago	37.50	37.50	37.50	49.25
Malleable, valley	33.50	33.50	33.50	42.70
Malleable, Chicago	33.50	33.50	33.50	43.20
**Southern, No. 2, Birmingham.	33.50	33.50	33.50	35.75
*Southern Ohio No. 2, Ironton	33.00	33.00	33.00	38.60
Basic, eastern Pa.	32.00	32.00	33.00	40.75
**No. 2X Virginia, furnace	33.50	33.50	33.50	41.00
**No. 2X foundry, Philadelphia	34.25	34.25	34.25	43.25
Ferromanganese, 70%, delivered	250.00	250.00	250.00	425.00
Bessemer billets, Pittsburgh	47.50	47.50	47.50	85.00
Bessemer sheet bars, Pittsburgh	51.00	51.00	51.00	88.00
Open-hearth sheet bars, Pitts.	51.00	51.00	51.00	88.00
Open-hearth billets, Pitts.	47.50	47.50	47.50	85.00
Steel bars, Pittsburgh	2.90	2.90	2.90	3.50
Steel bars, Chicago	2.90	2.90	2.90	3.84
Iron bars, Philadelphia	3.50	3.50	3.50	4.109

	Prices May 29, 1918	Average prices April, 1918	Feb., 1918	May, 1917
Iron bars, Cleveland	$3.64	3.64	3.64	3.25
Iron bars, Chicago mill	3.50	3.50	3.50	3.39
Beams, Chicago	3.00	3.00	3.00	4.34
Beams, Pittsburgh	3.00	3.00	3.00	4.00
Beams, Philadelphia	3.185	3.185	3.185	4.659
Tank plates, Pittsburgh	3.25	3.25	3.25	4.50
Tank plates, Chicago	3.25	3.25	3.25	5.49
Tank plates, Philadelphia	3.435	3.435	3.435	7.559
Sheets, blk., No. 28, Pitts.	5.00	5.00	5.00	7.00
Sheets, blue anld., No. 10, Pitts.	4.25	4.25	4.25	6.65
Sheets, galv., No. 28, Pitts.	6.25	6.25	6.25	8.80
Wire nails, Pittsburgh	3.50	3.50	3.50	3.50
Connellsville furnace coke	6.00	6.00	6.00	8.00
Connellsville foundry coke	7.00	7.00	7.00	8.50
Heavy melting steel, Pitts.	29.00	29.00	30.00	28.40
Heavy melting steel, eastern Pa.	28.50	28.30	30.00	26.00
Heavy melting steel, Chicago	29.00	28.65	30.00	28.70
No. 1 wrought, eastern Pa.	34.00	34.00	35.00	40.75
No. 1 wrought, Chicago	33.50	33.50	35.00	36.40
Rerolling rails, Chicago	34.00	34.00	35.00	36.80

*1.75 to 2.25 silicon. **2.25 to 2.75 silicon.

(For Additional Prices See Page 1404)

Freight Rise Boosts Iron Costs

Higher Haul on Ore, Coke and Limestone Will Add $1 to $1.50—Valley Increase Figured at $1.10—Steelmaking Tonnages Are Allocated Including 35,000 Tons of Basic and Low Phosphorous

Pittsburgh, May 28.—Plans of the railroad administration to increase freight rates on June 25 have greatly interested blast furnace interests. According to published schedules, the increases will mean practically an additional cost of $1.10 in making pig iron, valley basis. The present rate on coke from Connellsville to Youngstown, O., is $1.35 per net ton and this will be increased by 40 cents or to $1.75; ore will be increased 30 cents and limestone 20 cents. Considering one ton of coke, two tons of ore and one-half ton of limestone to a ton of pig iron, the increased cost of production through the new rates will be $1.10 a ton. Added to this, wages were increased 15 per cent April 15, or about 40 cents a ton. The total increased cost of production since the price of pig iron for the second quarter were fixed accordingly will be $1.50 a ton. Moreover, the prices were reduced April 1, basic being cut $1, and when this is taken into account, the net loss to the furnace will be $2.50 a ton. The consumer will absorb any increase that may be made in the freight rate on pig iron inasmuch as iron is sold on a basis of f.o.b., furnace. The increase in the rate of coal will not mean much to pig iron makers except in bringing about a higher cost of by-product coke. The advances are held to constitute a good argument for the maintenance of the existing prices on pig iron for the third quarter, if not for an increase. Reports from producers and consumers in connection with the survey of the pig iron situation are coming in more slowly than was expected and efforts are being made to speed them up. Reports also are heard that some consumers are piling stocks and that others have specified greater tonnages than they will need for the production of essentials. The war industries board, it is said, is investigating these reports. Piling of stocks and asking for iron not needed for essential manufacture, are opposed by the government. Demand for iron still is strong, despite the fact that consumers know nothing is available. Some are begging for iron whether small or not, as off grade. One consumer in New York has been scouring this market for about 5000 tons of No. 2 foundry iron. Production is estimated at between 90 and 95 per cent of capacity.

Unsatisfied Needs Pile Up

Boston, May 27.—Orders for iron continue to accumulate in the offices of local pig iron brokers and furnace agents, for while some rather pressing needs have developed as a result of melters taking more business than they were covered on, little or no success has attended the efforts to place the business. The main aim of the furnaces still seems to be to get clear of old orders before accepting much new business. Inquiries even for comparatively small tonnages get no greater attention than do the larger ones. An inquiry for 200 tons of No. 2 foundry for third quarter and another for 200 tons each of No. 2 plain and No. 2 X for last half have been on the market and efforts to place them at several points have not borne fruit. In the matter of deliveries, matters are quite satisfactory as far as Alabama and northern irons are concerned and some improvement is noted on Virginia shipments. Ala-

bama furnaces, as a result of comparatively clear routing, are reported to be almost caught up on arrearages. In connection with the improvement in the deliveries of Virginia iron it is reported that the furnaces are asking where contracts call for 2.50 silicon or better that they be permitted to ship lower silicon. The coke situation is understood to have something to do with this request. The questionnaires distributed by the furnaces at the instance of the American Iron and Steel institute are being sent in freely. The fact that the distribution of the blanks was made by agents and brokers instead of by the furnaces direct has meant more or less duplication and this has led to some confusion, since practically all consumers have been getting more than one blank. The replies indicate a very heavy percentage of New England production is for direct or indirect government use.

Fill in Questionnaires

New York, May 27.—Pig iron questionnaires during the past week were circulated among their customers by all eastern blast furnaces, and many of them already have been filled in and returned. It is expected that all of these questionnaires will have been received and sent to Cleveland before the end of the week. The eastern pig iron market is at a standstill as far as business is concerned, but many inquiries continue to come out, principally for small tonnages, since consumers realize the futility of trying to cover for large tonnages at this time. No sales of any kind have been reported during the past week, and even the customary spot sales of off iron were lacking. A few furnaces report that due to the improved production resulting from the present adequate supply of coke, they expect to have some iron to sell before July 1. A feature of the week was the granting of licenses by the government for the shipment of moderate tonnages of foundry iron to China. None of this business apparently was put through as the prospective buyers are having trouble in locating the iron.

Returns Come in Slowly

Philadelphia, May 28.—Fears are expressed in the pig iron circles that the questionnaire now being circulated among consumers by the furnaces by the committee of pig iron ore and lake transportation, will not bring out the information required to tabulate the exact situation in the industry. It has been suggested that more effective results might be obtained by inquiring for the exact information in each grade of iron instead of calling for statistics of such a general character. Some consumers are slow in filling in the blanks owing to doubts as to how their reports will be received when they disclose they have sold their output only a few months ahead, although they have covered on their pig iron requirements for the rest of the year. Some furnaces have not yet heard from any of their customers. No sales of iron are reported although inquiries continue numerous. Pottstown and Eddystone, Pa., steelmakers are to be supplied with 10,000 to 15,000 tons of basic for war work through allocations made in their behalf by the pig iron committee. The Old Dominion furnace, Roanoke, Va., has been switched from foundry iron to spiegeleisen for E. E. Marshall, Philadelphia.

Demand is Maintained

Buffalo, May 28.—The pig iron situation in this district continues dull though the demand is as strong as it ever has been. There is no selling of iron and makers are not prepared to say when they will resume quoting. The whole matter of the resumption of regular trading is in a hazy condition but most furnacemen assume that the government will more than keep them busy for an indefinite time, so are not thinking about any other business. Attention is being given to the circulation of questionnaires to consumers, which when filled out will be sent to the subcommittee of the American Iron and Steel institute which has the allocation of government business. "A thousand customers want to buy iron," said the sales representative of one furnace interest, "but we can give them nothing." As far as can be learned not a single order of the smallest nature has been booked during the past week. One Tonawanda furnace of the Donner Steel Co. is due to go in on ferromanganese May 29.

Steelmaking Grades Allocated

Cleveland, May 28.—Steelmaking irons have figured heavily in the week's allocations for war requirements. It is thought that in basic iron especially this reflects a severe shortage in this grade, which has blocked the efforts of consumers to buy on their own account and which was predicted would reach an acute stage about July 1. A Monessen, Pa., consumer wants 14,000 tons at the rate of 1750 tons monthly, beginning in May; an Eddystone, Pa., steelmaker, 7500 tons, to be delivered 1000 tons monthly beginning in August, for Fleet corporation work; and a Pottstown, Pa., plate mill 4000 tons for eight months' shipment, covering business for the Fleet corporation and the British war commission. The Watertown, Mass., arsenal has been seeking large lots of low phosphorus iron for ordnance department needs. One lot of 6400 tons, May to December delivery, and another of 600 tons of prompt iron of another analysis were placed with the Pottstown, Pa., producer. The arsenal now is seeking 1600 tons of copper-bearing iron for May-December delivery. The American Car & Foundry Co. is out for 700 tons of standard bessemer for June-December delivery at Detroit for ordnance work. The Portsmouth navy yard wants 400 tons of low phosphorus of two kinds. Other demands up for allocation include 2000 tons of Nos. 2 and 3 foundry for last half for the Cramp shipyard, Philadelphia, which is Fleet corporation work; 3500 tons of No. 2 for 10 months in equal installments for a Minneapolis user, also Fleet business; and 250 tons of Nos. 2 and 3 foundry and 50 tons of 10 per cent bessemer ferrosilicon for the Panama canal. Open market inquiries still are appearing including 15,000 tons of last half basic for southern Ohio delivery. There are quite a few inquiries for next year. Makers in this territory are unwilling to accept additional business now. If later on they accept any orders in the open market, these will be made subject to a contract clause permitting cancellation or postponement as the iron is called for by any war agency.

Inquiry for 1919 Iron

Chicago, May 28.—An inquiry for a small tonnage of Lake Superior charcoal iron for 1919 delivery has been received by a Chicago seller, the first sign of interest in that distant delivery. Books have not been opened for next year and the inquiry was not entertained. Otherwise the situation is little changed from the weeks that have preceded. Some inquiry for lots of 500 to 1000 tons are being received, usually from melters who have bought from other sources in the past. They appear to be taking chance in an effort to obtain something somewhere and somehow, after being unable to get further supplies from their regular dealers. These inquiries are not productive of results. An Illinois manufacturer of sewing machines continues to seek 1000 tons and a pump manufacturer with an order for trench pumps wants 200 tons for immediate delivery. The situation seems to be drifting rapidly toward the point where melters with government work will receive iron and those without it will not be able to obtain much metal. Returns on the questionnaire indicate that most foundries have iron on their yards for about three months use, a

condition that appeared on a recent survey by a local seller. Southern sellers are not booking business, though they are not sold completely for their output for the year. Fuel uncertainties seem to be holding them back until they can see their way more clearly.

Urging Forward Shipments

Cincinnati, May 27.—Any rumors that the freight rate on pig iron from Birmingham to Cincinnati had been changed from $2.90 per gross ton are without foundation. The scheduled advance of 25 per cent on all freight rates which sellers and consumers understand is to take effect on June 25, has caused a lot of melters to urge shipments forward. They will only be partially successful in this because cars are not yet plentiful enough to move the iron as wanted. Any number of inquiries are received for foundry iron, but the furnaces are holding back on selling what they can spare for last half shipment. As it is recognized that government needs are paramount over all other calls, makers of iron are not willing to take any new business. In many instances the furnaces have sold practically their entire outputs for this year. This is especially true in the Ironton district. Shipments from the south have been partially relieved by the raising of embargoes to points above the Ohio river.

Inquire For Next Year

St. Louis, May 25.—New inquiries for pig iron this week have fallen off materially, due, according to dealers and producers, entirely to the fact that consumers know the futility of trying to get metal. The demand before the market, however, continues enormous, as virtually none of the inquiries received earlier in the month have been filled. Among the few inquiries heard of were a number for delivery in 1919, all of which were pigeonholed. There was an inquiry from a Milwaukee user for 1000 tons of No. 2 southern for delivery up to December, and several for minor tonnages of the same grade from Buffalo. Commercial users here have been greatly concerned by the questionnaires issued by the pig iron committee of the American Iron and Steel institute. They are taken as a confirmation of the opinion that July 1 will find the market on a purely war basis. Southern blast furnaces are speeding up production as much as possible, and shipments from Birmingham have been closer to normal than at any time since the cold weather. Southern producers, however, are complaining of labor scarcity as well as lack and poor quality of raw materials. Eastern and northern furnaces are averaging well on deliveries.

Cars Keep Ahead of Ovens

Railroad Service to Connellsville Coke Region Better Than Production—Market Activity May Develop Soon

Pittsburgh, May 28.—Supplies of coke are moving freely from the Connellsville region and are meeting fully the requirements of furnaces. Some consumers are reported to have been able to accumulate tonnages in excess of immediate needs. Occasionally complaint is made by pig iron producers that difficulty is experienced in getting coke on account of freight congestion, but this is unusual. The supply of cars continues to be greater than the present rate of oven production. The Monongahela railroad still is being given a 100 per cent supply and the average on the Pennsylvania for both yesterday and today was 97.6 per cent, as about the same as for the past two weeks or more. Virtually no free coke, either furnace or foundry is being offered but the trade would not be surprised to see an open market develop soon. Sellers are not contracting for the future requirements of furnaces. The fact that prices are regulated by the government is held by some coke interests to make it unnecessary to take contracts. According to reports from Washington, freight rates of coke will be advanced June 25. The flat increases per net ton, will range from 15 cents where the existing rate is 49 cents or less to 75 cents where the existing rate is $3 or more. This will mean an increase of 40 cents a ton from Connellsville to Youngstown, O., the present rate being $1.35 and 25 cents from Connellsville to Pittsburgh, the present rate being 90 cents. This added charge will fall on blast furnace interests, as coke rates are made on a basis of f.o.b., ovens. Production for the week ending May 18 totaled 343,270 tons, as compared with 341,110 tons for the preceeding week, according to *The Connellsville Courier*.

Drawing on Local Supply

Boston, May 27.—Connellsville coke now being entirely shut out of this territory, there is nothing available except the local product, of which there is a very satisfactory movement. It is hinted in some quarters that New England consumers are ordering as much as double the amount of coke that they can use or handle, but in explanation, it might be stated that a good many foundries ordered Connellsville coke when there was only a slight chance of getting it and that they at the same time ordered local coke.

By-product Furnace Sold

New York, May 27.—The New Jersey by-product coke maker has made numerous sales of its product to eastern furnaces lately. A large tonnage was involved since a fairly large proportion of this maker's output is furnace coke. This business is for delivery the remainder of this year and for the year ending July 1, 1919. The New Jersey maker also has booked considerable additional foundry tonnage for the same deliveries. Demand for by-product foundry coke, however, now is less active, most consumers in this district having covered their forward requirements.

Offer By-Product Fuel

Cleveland, May 28.—Local by-product interests now are offering some coke to foundries in this district at the fixed price of $8.75, ovens, plus the switching charge. Sales are being limited to spot delivery. The offering is from a surplus created by better coal supplies.

Complaints Still Prevalent

Cincinnati, May 27.—The production of coke is holding up well and the car supply is also very good. The comparatively fast movement of coke from producing districts is continuing. It would seem that in the circumstances there should be no complaints from the consumers. This is not the case and complaints are just as numerous as ever and probably a little more insistent. Consumers of the fuel are anxious to get a stock ahead, as last winter's experience was a very bitter and costly one.

Stringency Is Acute

St. Louis, May 25.—No relief in the coke stringency has materialized this week and the volume of inquiries has been as heavy and urgent as during any seven-day period since the war started. The personal equation and every other possible subterfuge is being resorted to to get hold of even one car but dealers find themselves in the position of being unable to furnish anything. Ovens in the Connellsville and Virginia fields, according to their local representatives, have nothing to offer for months ahead.

No Fuel Being Offered

Birmingham, Ala., May 28.—No coke is being offered on the open market in the Birmingham district although inquiries are numerous. Producers of coke apparently have promises out to accept business as old contracts expire and very little is being said of the expiration of old orders.

Scrap Activity is Spotty

Most Districts Report Lively Demand and Better Movement—Quiet Conditions at Chicago and St. Louis—Supplies Scarce

FOR COMPLETE SCRAP PRICES SEE PAGE 1404

Buffalo, May 28.—The scrap market in this district remains active with every grade in strong demand. There is no change in prices, however. There is distinct improvement in the stocks of various consumers, due to a steady flow of material throughout the past week. Receipts of material have been better during the past week than for many months past. Big tonnages of shell turnings are coming into the market from shell plants of the district. Most of the turnings are consumed in the district, with some tonnages going to Pittsburgh. No complaint of car trouble has come out for some time, and the transportation situation is reported satisfactory.

Demand is Insistent

Boston, May 27.—There continues to be a very keen demand for everything in scrap that this section of the country develops but the actual turnover is of rather moderate proportions owing to the fact that supplies are extremely limited. Actually, the demand exceeds the supply. Between the shipments made on old orders, which were held up during the winter by the severity of the weather and the poor transportation facilities and a brisk demand since, practically all accumulations have been reduced to the vanishing point. New England really is facing something of a scarcity of scrap and wholesale dealers still report little trouble in obtaining full government maximums plus commissions because of the supply situation.

Rejections Confined to Steel

Philadelphia, May 29.—A feature of the scrap market in eastern Pennsylvania district which tends to illustrate the present relation of supply and demand is that rejections now are confined almost entirely to heavy melting steel. There are practically no rejections in wrought scrap which is exceedingly scarce and difficult to obtain. No sizable transactions in scrap are being made. Prices remain steady.

Demand Continues Active

New York, May 27.—Dealers in iron and steel scrap in this district continue to report a good demand for practically all grades. Prices, consequently, are firm with most of them at the government maximum. Despite the current volume of trading no marked scarcity of material is noted, with the possible exception of cast scrap. Foundries still are making a heavy drain on this material, as a result of the continued shortage of pig iron. Railroads now, almost without exception, are selling their entire output of scrap direct to consumers. No fluctuations in quotations have been noted during the past week.

Tonnages Move More Freely

Pittsburgh, May 28.—Tonnages of scrap are moving more freely in this district. While most dealers say there is a scarcity of all standard grades, they report that the market is in a much more satisfactory condition than it has been in a long time. Permits from railroads to make shipments are easier to get, and deliveries are going to consumers without difficulty. Mills are inquiring for all the leading grades and practically all of them are willing to pay dealers the commission of 3½ per cent on sales. The leading consumer, however, it is said, is not willing to do so. Considerable dealing still is being done directly between consumers and dealers, although the practice is much less general than it was before the war industries board consented to allowing the payment of a commission. The market is firmer. Sales made to consumers in this district during the past week, in all of which a commission was paid, included 4000 tons of machine shop turnings, which went at the maximum price of $19, delivered; 2500 tons of unguaranteed low phosphorus material at $33.50, delivered, 50 cents under the maximum; 2000 tons of cast iron borings at $19, delivered, the government maximum, and 1000 tons of heavy cast scrap for open-hearth consumption at the maximum of $29, delivered.

Dealers Absorb Increase

Cleveland, May 28.—Until present contracts run out, scrap iron and steel dealers will have to carry the load of the increased freight rates Director General McAdoo has announced will be effective June 25. After that the dealer will pass the increases along to the producer of scrap. Machine shop turnings and borings are somewhat stronger, though not enough to mark prices up. Users of scrap in the Mahoning valley and in Canton are reported in the market for fair amounts. Heavy melting steel continues the grade showing the most activity. A large Pennsylvania railroad list is expected to be out next week. Dealers already are speculating on third quarter prices, and the general belief is that a $1 reduction all around can be looked for. No. 1 busheling may be reduced further, some dealers predict.

Railroad Offerings Larger

Chicago, May 27.—As a general proposition, the scrap market is unusually quiet, with comparatively little material moving and not much coming out from usual sources. In advance of bookings by bar iron mills, of car-building material, which is expected to increase demand for rolling mill grades, and in view of the small supply of this material now coming out, some activity has resulted recently as dealers have sought to obtain a supply to meet the expected demand. Railroads are marketing somewhat larger tonnages than recently but not sufficient to meet probable needs. The Rock Island railroad offers 3500 tons, which includes 500 tons of No. 1 steel rails and 400 tons of No. 3 steel rails, the latter being short lengths. The Monon offers 1300 tons, of which 400 tons are steel rails. The Santa Fe offers 1900 tons, the Chicago, Milwaukee & St. Paul 900 tons and George W. Jennings & Co., 230 tons.

Prices Much Firmer

Cincinnati, May 27.—Dealers are busy filling some orders for scrap to be shipped promptly and they have also sold considerable material for future delivery. Prices are very much firmer. While the limit has been reached on some grades, a few can stand further advances before reaching the maximum quotations at consuming points. The freer movement of scrap to Pittsburgh territory has done something to make the market a little stronger, and the scarcity of some kinds of scrap also has been a factor. Foundry melters are buying ahead as far as possible.

Sales at Minimum

St. Louis, May 25.—The scrap iron and steel situation is about as quiet as it can be. During the last 10 days sales to consumers have been at a minimum, and none of the melters is displaying the least interest in securing supplies. They are pressing dealers for deliveries on old contracts, however. Some few sales between brokers have

been made from day to day, but with the speculative element eliminated, the market shows no life. Prices remain stationary, but the trend of values is somewhat easier. Heavy melting steel, which heretofore has enjoyed relative popularity, is more plentiful and a shade easier. General conditions of fuel and labor with the plants are favorable, and consumption continues at a high mark. Railroad offerings were as follows: Chicago, Burlington & Quincy, 3600 tons; Louisville & Nashville, 2750 tons, and Chicago & Alton, 1200 tons. Country supplies have been unusually light this month.

Uncertainty Still Prevails

Birmingham, Ala., May 28.—Uncertainty still prevails in the southern scrap market. Deliveries are being made on old contracts and these are beginning to be worked out. Stocks are dwindling as the dealers are making no effort to stimulate the gathering of country scrap.

New Ore Rates

Are Being Studied Closely—Boats Are Delayed on Lower Lakes

Cleveland, May 28.—Increases in freight rates are arousing deep interest in the ore trade. Ore rates are advanced 30 cents a ton, an increase of more than 40 per cent over the present rate to the valley and of smaller percentages in the rates to more distant points drawing their ore from lower lake ports. The influence of this increase upon costs is being studied.

Upper lake docks are handling ore more freely and the congestion prevalent there a few days ago has shifted to the lower lakes. The car supply is fair, but boats are meeting some delays in unloading ports. The Thursday holiday will result in increasing this congestion.

Ore traffic from the Lake Superior ranges to upper lake ports will be under the direction of a committee recently appointed by the railroad administration. W. W. Walker, Duluth, vice president, Duluth, South Shore & Atlantic railroad, is chairman. Other members are W. A. McGonagle, Duluth, president, the Duluth, Missabe & Northern railroad; F. S. Elliott, Superior, Wis., general superintendent, Great Northern railroad; E. D. Brigham, Chicago, Chicago & Northwestern railroad; W. E. Tyler, Green Bay, Wis., Chicago, Milwaukee & St. Paul railroad. This committee will co-operate with the vessel, coal and steel committees now handling lake trade, in order to facilitate the transportation of ore and grain to upper lake ports.

France Needs Own Steel

Will Be Able to Supply No More Shell Material—Specifications Still Cause Trouble—Government Looks Into Discards

New York, May 29.—Certain conditions have come about whereby the French will be unable to furnish our government with any more shell steel. The shutting off of this material means that the mills here will have to speed up production as never before. Just how they will do this in the face of the scarcity of steel is not known but several shell steel makers are of the opinion that the entire country will be combed and all steel which is not absolutely needed for other purposes will be placed at the disposal of shellmakers. They declare the only forging steel now reaching the commercial trade is that of off-grade heats. Shell steelmakers are of the opinion when the shortage of heat-treating facilities are taken into consideration that the mills in this country should adapt themselves to the making of shell steel under British specifications. These specifications call for a thick-wall shell which requires little heat treatment and is less liable to buckle in the gun when fired. Under these specifications it is declared the production of shells would also be increased on account of the chemical requirements having wider limits. This would lessen the number of off-heats. A shell-steel maker in the Cleveland district who for the past month has been enlarging his heat-treating plant and during this time had ordered all incoming shipments of shell bars stopped, now reports that the plant is completed.

Looking Into Discards

Philadelphia, May 29.—Sheet steel discards are being produced on such a large scale or of a tonnage almost equal to that of shell rounds and it is learned the government now is investigating how it may use this tonnage for war business. Practically the only activity in the Eastern semi-finished market is, at present, in shell discards. An Eastern maker has been allotted 1000 tons of billets for Italy. Consumers performing government work are beginning to inquire for billets and slabs for third quarter.

Using More Bessemer Steel

Pittsburgh, May 28.—Makers of sheets and tin plate are resorting to a freer use of bessemer sheet bars because of their inability to get open-hearth steel. The supply of semi-finished steel, including sheet bars, billets and slabs, is entirely inadequate to meet the inquiries. Middlemen have searched the market carefully to find tonnages for their regular trade, but have met with only small success and some of them have abandoned further efforts. Some large producers even have tried to get greater tonnages of both semifinished steel and ingots and have been able to obtain but light tonnages. One interest whose ingot output is extremely large is in the market for as large a tonnage of raw steel as may be offered. The market for discard steel also has become narrower and offerings are limited to small lots. In many cases the prices asked are higher than consumers are willing to pay. Some sellers of discard billets are asking levels that are equal to or only slightly under those fixed for soft steel. Sellers apparently consider the maximum price of low phosphorus scrap, $39, plus the cost of rolling and a profit, so that it is not unusual for them to name a price of $47.50, the maximum price fixed for soft 4 x 4 billets. Small lots of forging billets have been sold recently at $75, Pittsburgh, or more. Wire rods are in active demand, but makers are out of the market. Occasionally they find light tonnages for their regular customers.

Shell Steel Required

Cleveland, May 28.—A round tonnage of shell steel will be called for by a local motor car manufacturer who has just received a large contract to produce 6-inch shells. Most of this contract is to be filled at a branch plant in another northern Ohio city. There is some talk that further differences over shell steel specifications have developed between the producers and the government and the latter has been asked to make additional modifications. Sheetmakers continue in trouble to get steel supplies. One maker has sought to induce the mills to roll sheet bars from shell steel discards.

Demand for Strip Steel

Pittsburgh, May 28.—Heavy demand prevails for both hot and cold rolled strip steel practically all of which is wanted either directly or indirectly for the government. Production of hot mills is estimated at 80 per cent and of cold mills at about 85 per cent. Makers of the latter are complaining of a shortage of steel.

Car Axle Orders Divided

Distribution of 392,000 is Stated—Rivet Reduction Surprises —New Government Bar Demands Not So Heavy

Philadelphia, May 29.—Distribution of 392,000 axles for the 100,000 cars recently ordered has been made by the railroad administration. Of this number, the Carnegie Steel Co., received 95,000, the Illinois Steel Co., 84,000, the Pollock Steel Co., 149,000, the Laclede Steel Co., 16,000, the Pittsburgh Forge & Iron Co., 18,000, and the Midvale Steel Co., 30,000. Large tonnages of re-enforcing rods rolled from discards have been distributed for government construction work. These include 15,000 tons for the army supply base in South Brooklyn of which the Bethlehem Steel Co. will supply 5000 tons.

Car Axles Placed

Chicago, May 27.—Although the order has not come through officially, it is understood that axles for the government's order of railroad cars has been divided. The information is that the Carnegie Steel Co. will furnish 110,000, the Pollak Steel Co. 132,000, and the Illinois Steel Co., 84,000. The remainder of the 400,000 axles are understood to be divided among smaller makers. These axles are said to be somewhat over ordinary weights, which will run up the tonnage. Government orders have not been placed with western mills in as heavy volume during the past week as previously with the exception of these axles. Other buyers are unable to place contracts with any steelmaker.

Bar iron is quiet without large volume of new business, although there is constant demand for small tonnages to use in place of steel bars. This is all for immediate delivery and no last half business is being asked. Some assistance in this delivery is expected when material for freight cars is divided.

Hard steel bars rerolled from rails are in strong demand but mills will sell only in proportion to their receipts of steel rails. Inasmuch as the latter are scarce, it is not possible to assume much additional tonnage.

Are Operating Heavily

Pittsburgh, May 28.—Makers of iron and steel bars are operating heavily and are keeping up with their schedules in a satisfactory manner. Demand for both iron and steel bars coming from railroads and industrial interests is large and practically all of the tonnage is for the government either direct or indirect. Implement makers are being supplied freely with steel bars. Makers of iron bars will meet next month with members of the Amalgamated Association at the regular annual convention in Atlantic City to discuss scales of wages for the year beginning July 1. The association convention at Joliet continued existing basis rates and made few minor changes in some details. Manufacturers have not denoted what their attitude will be, but it is not believed any fundamental changes will be suggested by them.

Demand is Heavy

Chicago, May 27.—Although several million nuts and bolts were placed with manufacturers by the government during the past few days this takes care of only a portion of the large order which has been pending for several weeks. This is understood to be 25 per cent of the carriage and machine bolt requirements, which are to be filled from stock for immediate shipment, leaving 75 per cent yet to be placed and a large number of other forms in addition. General demand for nuts and bolts is heavy and all makers are well supplied with orders.

Reduction is Surprise

Pittsburgh, May 28.—Makers of rivets say they are unable to explain the action of the committee on steel and steel products of the American Iron and Steel institute in reducing the price of that product. The reduction amounts to $5 per ton. The price of structural rivets was cut from $4.65 to $4.40 per 100 pounds, Pittsburgh, of boiler rivets from $4.75 to $4.50 per 100 pounds, Pittsburgh, and of small rivets from 45 and 10 off to 50 and 10 off, Pittsburgh. The prices of bolts and nuts were left unchanged. The car-building program will call for 15,000 tons of rivets and 18,000 tons of bolts and nuts, according to official estimates of the railroad administration. The administration has received quotations from makers of nuts, bolts and rivets, which are strictly in accordance with set figures and builders of the 1,000,000 cars for which orders recently were placed will buy at these levels from the plants nearest their works or with which they have been doing business. Operations of nut, bolt and rivet makers are heavy, some of them being on a 100 per cent basis. War demand is brisk.

List is Rearranged

Pittsburgh, May 28.—Rearrangement of the hoop, band and bar list is brought about by the action of the steel and steel products committee of the American Iron and Steel institute. This step forms a separate card of extras for band steel, differentiating between bands and bars which heretofore took the same list of extras. It removes 3/16-inch and lighter sizes from the bar card onto a special band classification of extras. Minor changes were made in the hoop card. The price of bands and hoops now is $3.50, base, Pittsburgh, with special quality and carbon extras applying. This increases the band price $12 per ton. Stamping quality 0.20 and under of carbon was advanced 50 cents per 100 pounds. Special extras also were provided for slitting, pickling, cutting, etc. Hoop steel is in active demand, a considerable portion of which is for makers of oil barrels and producers are able to supply consumers rather freely.

Government Buying Shafting

Pittsburgh, May 28.—Large sizes of cold rolled shafting are being bought either directly or indirectly for the government, while demand for smaller sizes also is active. Makers are making deliveries in four to six weeks. Inquiries from the automobile and screw stock trade are light.

Price Range

Shown in Spiegeleisen—English Ferro Sellers Seek Licenses

New York, May 27.—Disparity in the prices of prompt and future spiegeleisen continues. Some makers are quoting spot 16 per cent at $75 to $77, furnace, and futures at $70 and 18 per cent at $77 plus $3.50 for each additional unit. Other makers name $74 to $75, furnace, for all deliveries, and $82 for 18 per cent. Several thousand tons of 18 per cent have been sold at the latter price, and sizable sales of 16 per cent for future delivery at $74 to $75, although recent sales have been done at $70. The Andrews Steel Co.'s inquiry for 18 per cent still is open.

Several thousand tons of domestic ferromanganese have been sold during the past week at $250, delivered, for 70 per cent metal, and fair inquiries continue pending. Since the war trade board, as reported in last weeks issue of THE IRON TRADE REVIEW, agreed to permit the importation of 12,000 tons of English ferromanganese, all the

importers have made applications for tonnages which they believe will represent their share of this total, and which they expect their principals will be able to export from England.

Much variation continues to be shown in prices on 50 per cent ferrosilicon. Carloads are being sold right along at $155, delivered, and large tonnages at $150, by the leading maker. Higher prices are being obtained on spot metal by other makers, but little difficulty is had in securing general offers of $160 or less, from most makers.

Large sales of ferrotungsten have been made at $2.25 to $2.30, furnace, per pound of metal contained, for 70 per cent, and at $2.35 for 80 per cent.

On 60 to 70 per cent ferrochrome, containing 4 to 6 per cent carbon, spot may be had at 40 to 45 cents per pound, furnace, while 6 to 8 per cent carbon metal is quoted from 35 to 40 cents.

Market Becomes Quieter

Pittsburgh, May 28.—Activity in the market for ferroalloys diminished during the past week. The tone is strong and there are reports in circulation that higher prices will be asked soon for ferromanganese and spiegeleisen. A Cleveland consumer has put out an inquiry for 500 tons of 16 per cent spiegeleisen. The La Belle Iron Works, Steubenville, O., has bought 1000 tons of 40 per cent spiegeleisen and is said to have paid a price slightly below $4 per unit, furnace, for the tonnage. The market for 70 per cent ferromanganese remains firm at $250, delivered. Spot 16 per cent spiegeleisen is quoted at $75, furnace, and contract tonnages at $70, furnace, although quotations of about $5 higher than these are being named by at least one producer. The market for 50 per cent ferrosilicon is not active. It is quoted at $165 to $175, delivered, for spot shipment, and $155, delivered, for future shipment.

Spiegel is Sought

Cleveland, May 28.—A local steelmaker is inquiring for 500 tons of spiegeleisen for last half. A northern Ohio consumer in the week bought several hundred tons for similar delivery. Ferroalloy prices are unchanged.

Alloy Sales Steady

Chicago, May 28.—Demand for ferromanganese and spiegel is steady and selling is being done at a good rate. Prompt spiegel is somewhat scarce. Ore conditions continue satisfactory for the present.

Await Car Steel Orders

Reported Awards of 500,000 Tons of Plates and Other Forms Not Officially Established—Corporation Mills Credited With Most

Pittsburgh, May 28.—Allocation of plate, shape and bar tonnages in connection with the car building program, if made, has not been announced officially, according to producers here, and until that is done they say they do not know how the steel will be distributed. Car builders also are waiting for Washington to act so that they can get their tonnages and proceed with the building of rolling stock for the railroad administration. It is reported that the plan of allocation will be announced in a day or so. At the same time there is a report that orders for approximately 400,000 tons of steel for cars actually have been placed and the remainder has been allocated. This report has it that Steel corporation mills will produce practically 50 per cent of the plates and has received specifications for more than 130,000 tons.

Expect Orders to be Bessemer

Philadelphia, May 28.—Large tonnages of plates covering the recent government car order soon to be placed with various mills by the railroad administration, will be mostly of bessemer steel, it is believed. Plate mill schedules are being gone over by the Emergency Fleet corporation so that urgent requirements of the ship yards shall be placed ahead of the less pressing needs, and also that the mills nearest the fabricating plants will supply the steel. This is to obtain greater efficiency in ship production and to eliminate transportation wherever possible. Several thousand tons of additional plates for France were placed this week with eastern mills.

Allocation Still Awaited

Cleveland, May 28.—No allocation of the large tonnage of ship steel required for the additional vessels awarded to lake yards by the Emergency Fleet corporation yet has been made. The hull and boiler steel requirements for the 60 ships awarded to the American Shipbuilding Co. now are placed at 110,000 tons. It is believed all or most of this will be supplied by Steel corporation mills.

Plate Mills on Full

Chicago, May 27.—Although some steel mills have rolling capacity in excess of ingot production, the available supply of raw steel is not being divided equally among the various products. Inasmuch as steel plates for shipbuilding are considered of paramount importance, plate mills are being kept at maximum production and other products are sacrificed as being kept at maximum production and other products are sacrificed as being less essential to the war program.

Higher Price

On Tin Plate Demanded by Tin Situation, Say Makers

Youngstown, O., May 29.—At a recent meeting of tin plate manufacturers in Pittsburgh the pig tin situation was discussed at length and makers expressed the opinion that the base price of tin plate is too low to meet present conditions. At the time the base price of $7.75 was established pig tin was selling around 65 cents per pound. As the matter now stands makers declare they are paying close to $1 per pound for pig tin whenever they can get it. Each box of tin plate requires approximately 2 pounds of pig tin. Some producers who were present at the meeting, stated that any further increase in the price of pig tin would force them to close their mills unless the price of tin plate is advanced to $8 or more per base box. Most of the mills here are in operation but are hard pressed for tin bars. The entire production is going to the government indirectly for meat containers and is being shipped to the packing houses in the Chicago district.

Tin Plate Cargoes Beached

Pittsburgh, May 28.—Two cargoes of tin plate en route to Alaska have been battered and beached along the coast of that territory, according to reports received here. It is not certain that other cargoes, which made up a fleet going to Alaska to be worked up into cans for containers for fish, were not lost. Operations of the tin plate industry continue at about 95 per cent of capacity. Stocks in warehouses are approximately normal and shipments are satisfactory. By a ruling of the war industries board shipments have been shut off for consumers making different products which were held not to be war essentials. These included, among others, tobacco and paint cans.

To Get Government Shop

Pittsburgh Reported Will Be Location of Government Fabricating Plant—Big Projects Brewing—Place Ship Steel Nearby

Pittsburgh, May 28.—Reports which appear to be reliable have been received here that the government has selected the Pittsburgh district as the site for its proposed fabricating plant. Work of actual construction, it is understood, will begin in the immediate future. Details regarding the size of the shop are not known but the purpose is to erect it as quickly as possible in order to hurry the shipbuilding program. This activity is only one of numerous fast-developing moves denoting plainly that the government is going to assume a still closer supervision of the steel and allied industry. There is no doubt that the government has worked out plans for further and various war activities calling for immense tonnages of steel of all kinds and it is said that when these programs are announced officially, they will amaze even well-informed men in the trade. Already there is a report in circulation that requirements in sight involve an output of not less than 45,000,000 tons of ingots, or approximately 2,000,000 tons in excess of the total capacity of the entire industry. The demands being made on fabricating capacity by the government are extremely heavy and large orders are being placed regularly. No other work is being turned out or accepted and fabricators say it will be at least one year, if not more, before they can take any commercial business.

Eastern Demand Improves

New York, May 27.—Demand for structural steel for direct and indirect government work has increased somewhat. Included in the week's business, both placed and pending, are a number of railroad bridges, extensions to two manufacturing plants which are engaged on war work, and 10 additional buildings for the government at Lake Denmark, N. J. An unusual order was placed with the American Bridge Co. during the week; this involves the remodeling of the old railroad bridge across the Thames river at New London, Conn., into a highway bridge. This job calls for about 500 tons. Commercial jobs are practically absent. Priority shape orders during the week included only small tonnages, mainly for ship work.

Will Minimize Transportation

Philadelphia, May 28.—Determiation of the Emergency Fleet corporation to distribute fabricated steel awards for ships so that they involve a minimum of transportation, it is learned is the reason for the withholding of contracts for the material for 60 additional vessels for the American International Shipbuilding Corp. It is the desire of the Fleet officials to distribute the work to shops favorably located geographically instead of awarding it to plants without regard to the distance the material must travel as has been the case heretofore.

To Increase Tractor Output

Cleveland, May 28.—Tractor builders in this district will greatly increase their output this year over last. One of them is planning a production of 10,000 and now is in the market for the steel, about 1000 tons. An inquiry for 1800 7-inch channels of one length has been current from a local buyer.

A local motor car builder has received an order for about 2000 gun carriages for 3-inch field pieces and other types from the ordnance department. This is calling for from between 3000 to 4000 tons of steel.

War to Get Material

Chicago, May 27.—With mills unable to furnish structural steel except in cases required by the government for war work, and with warehouses and store stocks depleted by the heavy demand they have met for months, it is difficult for even a small job to be put through a fabricating shop. Where it has been possible in the past to pick up sufficient material from warehouses and yard stocks, it is found now that these are so broken as to make it practically impossible. The only important tonnage pending at present involves 450 tons for a shop building for Pawling & Harnischfeger, at Milwaukee, which will be devoted to the production of government necessities.

CONTRACTS PLACED

Bridge for Central Railroad of New Jersey, at Easton, Pa., 400 tons, to Phoenix Bridge Co.

Extension to plant of David Lupton's Sons Co., Philadelphia, 800 tons to American Bridge Co.

Shops for Baltimore & Ohio railroad at Glenwood, Va., 2500 tons reported to have been awarded to John Eichleay Jr. & Co.

Remodeling railroad bridge across Thames river at New London, Conn., into a highway bridge, 500 tons to American Bridge Co.

Colored Men's Y. M. C. A. building, West 135th street, New York, 200 tons, to George A. Just Co.

Kent avenue power house, Brooklyn, to American Bridge Co.

Building for National Aniline & Chemical Co., Buffalo, 250 tons to Pittsburgh Bridge & Iron Works.

Plate and shop for the New York Shipbuilding Co., Camden, 2500 tons to L. F. Shoemaker & Co.

Bridges for Pennsylvania railroad 800 tons to the Phoenix Bridge Works.

CONTRACTS PENDING

Ten additional buildings for government at Lake Denmark, N. J., 400 tons, bids being taken.

Two bridges for Chesapeake & Ohio railroad, 600 tons, bids being taken.

Extension to plant of De Laval Steam Turbine Co., Trenton, N. J., 300 tons, bids being taken.

Three bridges for Pennsylvania railroad, 750 tons, bids being taken.

CONTRACTS PENDING

Mill creek flood abatement plant, Dunkirk, N. Y., 275 tons of reinforcing steel required.

Wire for British

Allotted to Different Makers—Nail Orders Are Large

New York, May 27.—The most important business of the past week in the wire market was the allocation of 50,000 tons of barbed wire for England. This business was distributed through the wire subcommittee of the American Iron and Steel institute. It is learned that of the 50,000 tons of barbed wire for France, which was placed several weeks ago, and then countermanded, 5000 tons have been reordered, and that the remaining 45,000 tons are likely to be placed shortly. It has been decided not to allocate the 25,000 kegs of wire nails which will be required in building cars for the government.

Included in business allocated during the past two weeks were 40,000 kegs of wire nails for the bureau of supplies and accounts, navy department. It is understood that most of these nails will be shipped to France. It is learned that the 48,000 kegs of nails recently placed by the quartermaster's department at New York, all went to the Pittsburgh Steel Co.

Big Tonnages Allocated

Pittsburgh, May 28.—Mills in this district have been awarded a portion of 50,000 tons of annealed unpainted barb wire for military use for the British government which was recently allocated through the subcommittee on wire of the American Iron and Steel institute. Shipments are to be completed in September. It is reported that a large maker has been awarded a contract for 47,000 kegs of nails by the war department.

Steel Checks Sheet Mills

Inadequate Semifinished Supplies Still Upset Production—Work Up Inferior Material—Sheet Demand Remains Far Beyond Supply

Youngstown, O., May 29.—Valley sheet mills continue to operate unsteadily due to the scarcity of sheet bars. At nearly every plant all the units will be in operation one day and the next probably only one-half will be running. There seems to be little relief in sight. Even makers who are self-contained have mills idle from time to time because the government has asked that part of their bar output be shipped to nearby sheet mills turning out government orders. Recently an off-grade open-hearth heat which was too high in carbon content for the commodity intended for, was converted into sheet bars. These were sold without any trouble to a certain sheetmaker. This illustrates how hard pressed sheet mills are for sheet bars. The only objection the companies have to a high-carbon bar is that it plays havoc with their rolls. If sheets 36 inches wide are going through the mill and the order calls for 100 tons, the chances are that only part of this tonnage can be rolled before the rolls become grooved. When this condition presents itself, the rolls are either changed, which necessitates shutting down the mill, or the next smaller size sheet is passed through the rolls. The latter course is usually pursued, the only drawback being that the rolling of the balance of the order is delayed. Buyers continue to come to the valley and beg for sheets. Mostly black and galvanized are wanted.

More Tonnage for France

Philadelphia, May 28.—Eastern sheetmakers have received additional tonnage of blue annealed material for delivery in France. Some additional government business also has been placed with them.

Operations Increase Somewhat

Pittsburgh, May 28.—Operations of sheet mills have been increased somewhat during the past week. The American Sheet & Tin Plate Co. now is producing at a little more than 60 per cent of capacity. It is estimated the industry is operating at about 85 per cent. This improvement has been brought about by a slightly increased supply of sheet bars. Virtually all of the output of sheets is for war purposes, direct and indirect. It is claimed that even a portion of the trade itself does not fully realize the enormous consumption of sheets for strictly military and collateral uses. Large orders are being placed steadily. Galvanized, blue annealed and black sheets in large lots soon will be required in connection with the shipbuilding program. The car building program also will take heavy tonnages of corrugated sheets, the gage of which is not yet known. Makers have concluded that they will replace tonnages furnished by jobbers for the government where the jobbers can show the government order, although priority will continue to be given to direct government orders. Mills are sold up well beyond the third quarter.

Small Faith

Shown by Builders that Cars Can Be Rushed—More Delay

New York, May 27.—While railroad administration officials feel confident that the iron and steel requirements of the carbuilders will be forthcoming in good volume shortly, builders generally are not so optimistic. It appears to be their belief that little in the way of actual construction can be undertaken for at least four months, despite the fact that nearly one-half of the 1,000,000 tons of steel required has now been allocated. Builders state that they have little iron and steel on hand, and as for the wood entering into the construction, virtually all of this material is yet to be cut. This state of affairs, of course, reverts back to the delay of several months in the making of awards at Washington. Much of their early supplies of plates, builders believe, will be made up of material falling short of shipbuilding specifications, although suitable for other commercial purposes. Negotiations continue at Washington relative to specialties. Most of the locomotive specialties have been determined, but the majority car specialties has yet to be decided upon.

Inquire for Standard Spikes

Pittsburgh, May 28.—Small lots of standard spikes are involved in several inquiries that have come to makers in this district. The Pennsylvania lines are asking for 8000 kegs of this size and 414 kegs of boat spikes for July-October delivery. Quotations are being made on this business by some makers. The price of standard spikes is $3.90 per 100 pounds, mill, and of boat spikes $5.25 per 100 pounds, base, mill. Limited lots of 7/16 and ½-inch sizes also are available, but producers are sold up on 5/16 and 3/8-inch sizes, which are in strong demand by jobbers. Scarcity of steel has left considerable idle capacity for standard spike production.

Plans More Locomotives

Philadelphia, May 28.—The railroad administration is reported contemplates ordering additional locomotives soon. The government, acting in behalf of the French high commission, has placed 5000 tons of locomotives with various makers for the French railways. Lots of rails, mainly bessemer, of 500 tons or less are being sold from stock from $60 to $62.50, eastern mill. Otherwise there is no activity in the rail market.

Light Rails Active

Chicago, May 27.—Light steel rails for domestic use and for export are being sold steadily at a rate about equal to production, but standard rails are not available except occasional small tonnages of seconds or slight excesses of rollings.

Preferred Class

For Cast Pipe for Cities Asked—Iron Shortage Troubles

New York, May 27.—Pending efforts to obtain preferred classification for cast iron pipe, eastern makers continue to cope with a shortage of pig iron. Many of the foundries are largely booked with government business, and for this work are being given priority certificates; however, with private and municipal work, the situation is exceedingly difficult. Several manufacturers met in Washington during the past week to urge that a preferred classification be allowed in the interest of public health. Many of the cities engaged in war work have grown so rapidly, it was pointed out, that the building of a large number of new houses is necessary. It is reported that the government may allow manufacturers to obtain southern iron for this work, and confine their requirements to this grade alone, leaving the better northern iron available for other purposes.

Demand is Heavy

Pittsburgh, May 25.—Development of oil fields for the government is calling for large tonnages of iron and steel pipe, 6 to 8 inches in diameter. Makers are booking this business freely and are producing it as quickly as conditions will permit. Active demand also is being made for 4-inch lap weld iron and steel pipe.

Can't Define Steel Needs of War

Co-operative Survey of Government's Requirements Undertaken by Representatives of War Board and Industry Likely to Miss Fire—Reported Little Progress Has Been Made—Another Conference is Likely

WASHINGTON, May 28.—Apparent unwillingness on the part of the government to make known its possible maximum steel requirements seems to foretell failure of the war industries board's survey of steel production and consumption. This conclusion is not held by the war industries board itself but the opinion expressed in other branches of the government is to this effect. Failure of the survey evidently would mean, in the absence of some far more drastic step, that stricter adherence to the present priority system, supplemented by a comprehensive preferential list of steel consumers, will be the course to be followed.

The survey was placed in the hands of a joint committee representing both the war industries board and the steel and steel products committee of the American Iron and Steel institute, following a hastily called meeting here May 17. Just what the committee has been doing or what response it has met with on the part of government officials who may be reluctant to state their needs, has not been divulged. The statements of some of these officials has, however, indicated that the necessary frankness on their part has been missing.

The opinion has been ventured that the war department, the navy, the shipping board and the allies, as far as requirements of steel produced in this country is concerned, certainly should know approximately per man the number of tons of steel each will require. It is known, in each department, the amount of food, the number of pieces of clothing, the amount of ship tonnage, etc., required per man to clothe, feed, equip, transport, etc., each. Why, the question is asked, shouldn't this information also be known as regards steel?

Why Not Fix Steel Need?

One government official, in the shipping board, has declared that it is impossible for the Emergency Fleet corporation to know its own needs. The task is so great, he says, is so changing, that an estimate today may be far off tomorrow. This is also said to be true of the army where daily changes on the western front subsequently show their effect in the steel orders the department places. Then, too, the opinion has been expressed by some army officers that to divulge the possible maximum tonnage desired, even on a flexible maximum, would be to show a vital part of Uncle Sam's hand to Germany. It has been argued, in refutation of this attitude, that Germany already knows the capacity of the American mills and undoubtedly has figured on the entire output going into ships, guns, munitions, etc.

If the survey fails, as opinions here seem to think it will, it is altogether likely the advice of E. H. Gary, chairman of the United States Steel Corp., given at the meeting in New York when 100 per cent production was pledged to cover the government's war needs, will have to be followed even more closely. This advice was, "Use your conscience. And if you have any doubt about it, make inquiry." But to reduce the necessity of asking questions to the minimum and as a further guide to steel consumers as well as to producers, it is probable a list of preferred consumers, similar to that showing to whom coal should be shipped first, will be drawn up by the priorities division of the war industries board and subsequently announced.

For the present there is no change in the priorities system. It is highly probable that nothing will be done until after another conference of the war industries board and the steel manufacturers. Chairman Baruch of the board has declared that he does not want to act in this matter until after the question has been fully discussed by the board and the representatives of the industry. This policy was followed when the New York pledge meeting was called and also at the meeting here May 17, so Mr. Baruch evidently intends to permit of full consideration. However, his instructions to the joint committee were to act at once and to report as speedily as possible. Some developments may be expected at any time, 10 days already having passed.

Attack Competitive Iron and Steel Rates

WASHINGTON, May 28.—Competitive rates on various iron and steel products which were built up by the railroads under conditions of private operation, are not to be maintained while the government is running the carriers, if the interstate commerce commission passes favorably on new petitions for increased rates in central freight association territory just filed by the various lines within the prescribed zone.

The proposed increases affect long-haul rates on pig iron and billets, rates on cast iron pipe, proportional rates from the Ohio river on pig iron, billets and cast iron pipe and short-haul rates on manufactured iron and steel. Charcoal pig iron producing points in zones C and D in Michigan are excepted in the pig iron schedule. The various advances are in addition to the 15 per cent rise recently put in force. It is believed the petitions are forerunners to the general increase of 25 per cent in freight and passenger rates which the railroad administration has just announced, effective June 10 and June 25 respectively.

The revision is aimed at the substitution of the present commodity rates in pig iron, billets and cast iron pipe, car loads, by new tariffs based on the mileage system of class rates. The bases proposed are the sixth class for billets, 90 per cent of the sixth class for pig iron, fifth class for cast iron pipe and 90 per cent of the local rates on the several commodities for proportional rates. Short-haul manufactured iron and steel products, are asked to be put in the fifth class.

In pig iron it is set forth the present rates are widely divergent for the same length of haul; and that in many cases a given rate applies to different lengths of haul. It is declared that the rate of $2.54 applies to 27 hauls of varied

length, the minimum being 285 miles and the maximum 423 miles a spread of 138 miles. A maximum variation of 86 cents and a minimum of 11 cents per ton for substantially equal hauls is pointed out.

Rate tables compiled show that the present commodity rates on pig iron from different points of origin to all destinations, average 84.5 per cent of the sixth class rate on these hauls, indicating that the proposed increase only is a matter of 5.5 per cent. Pig iron producers, however, point out that these compilations are very misleading since they include rates from distant furnace points to various destinations which actually are inactive rates so far as selling competition in iron is concerned. The effect of the inclusion of these virtually non-competitive rates, it is declared is to swell the percentage average of the present commodity rates to sixth class rates. The real advance, therefore, involved in putting pig iron at 90 per cent of the sixth class rate is much more than that disclosed on the face of the data presented.

Taking Indianapolis as a typical non-producing point, the comparison between the proposed and existing rates is as follows:

PIG IRON

	Miles	Presept 6th class rate	Present pig iron rate	90 per cent 6th class	Increase
Buffalo	450	$3.40	$2.80	$3.10	.30
Pittsburgh	371	3.20	2.70	2.90	.20
Youngst'n	340	3.00	2.30	2.70	.40
Cleveland	284	2.90	2.10	2.60	.50
So. Ohio	245	2.70	1.80	2.40	.60
Zanesville, Ohio	238	2.70	1.80	2.40	.60
Canton, O.	296	2.90	2.10	2.60	.50
Dover, O.	282	2.90	2.10	2.60	.50
Cambridge, Ohio	265	2.80	2.10	2.50	.40
Columbus	180	2.40	1.70	2.20	.50
Hamilton, Ohio	99	1.90	1.40	1.70	.30
Chicago	184	2.50	1.70	2.30	.60
Detroit	276	2.80	1.80	2.50	.70
Toledo	222	2.70	1.80	2.40	.60
Pittsburgh	191	2.30	2.60		.30
Youngstown, O.	181	2.00	2.50		.50
Cleveland	138	1.80	2.20		.40
Canton, O.	130	1.80	2.10		.30
Dover, O.	102	1.70	2.00		.30
Cincinnati	116	1.60	2.10		.50
Hamilton, O.	104	1.60	2.00		.40
St. Louis	421	2.70	3.40		.70
Chicago	305	2.90	3.00		.10
Detroit	183	2.10	2.50		.40
Toledo, O.	124	1.70	2.10		.40
Muncie, Ind.	135	1.90	2.20		.30
Terre Haute, Ind.	252	2.20	2.80		.60

On billets, it is stated by the railroads, the common rate of $2.10 applies to 64 different hauls, ranging from 178 to 351 miles. On a given haul, the variation is from 11 to 90 cents. It is claimed by putting the billet rate in the sixth class, it will fit in properly with the present next higher group of manufactured iron and steel products which are in the sixth class and with the next lower group, pig iron. It is declared that prior to the 15 per cent advance, the billet rate from Pittsburgh to the 29 destinations given averaged 99.3 per cent of the sixth class and that the average of all producing points was 93 per cent.

Taking Columbus as a typical point on billets the relation between the proposed rates and the sixth class rates is as follows:

BILLETS

	Miles	Present billet rate	Present 6th class rate	Increase
Buffalo	320	$2.70	$3.00	.30
Columbus	305	2.70	3.70	1.00
Cincinnati	285	2.70	3.60	.90

Pipe Rates Show Spread

In cast iron pipe, it is set forth the present rate of $2.36 applies to 33 different hauls ranging from 237 to 371 miles. For substantially equal distances, the spread is from 11 to 94 cents.

An illustration of the proposed increase in cast iron pipe in the case of Chicago is as follows:

CAST IRON PIPE

	Miles	Present commodity rate	Present 5th class rate	Increase
Buffalo	511	$3.60	$4.30	.70
Scottdale, Pa.	530	3.60	4.60	1.00
Cleveland	339	2.70	3.80	1.10
Massillon, O.	350	2.70	3.90	1.20
New Comerstown, O.	371	2.70	4.00	1.30
Coshocton, O.	357	2.70	3.90	1.20

The revision of the short haul rates on manufactured iron and steel products, it is declared is necessary to complete the application of fifth class rates as a uniform basis for commodities of the character. Rates on manufactured iron and steel products on hauls of 85 miles or more now are of the fifth class.

IRON AND STEEL PRODUCTS

(Cents per 100 lbs.)

	Miles	Present commodity rates	Present 5th class rates	Increase
Pittsburgh	65	.06	.105	.045
Washington, Pa.	97	.07	.12	.05
Steubenville, O.	83	.07	.115	.045
Wheeling, W. Va.	107	.07	.125	.055
Beaver Falls, Pa.	35	.05	.09	.04
New Castle, Pa.	20	.04½	.075	.03
W. Middlesex, Pa.	20	.04½	.075	.03
Farrell, Pa.	14	.03½	.07	.035
Sharon, Pa.	13	.03½	.07	.035
Sharpsville, Pa.	16	.04½	.075	.03
Shenango, Pa.	27	.05	.085	.035
Greenville, Pa.	30	.05	.085	.035
Lowellville, O.	8	.03	.07	.04
Struthers, O.	5	.03	.065	.035
Girard, O.	5	.03	.065	.035
Niles, O.	9	.03	.07	.04
Warren, O.	14	.03½	.07	.035
Cleveland	67	.06	.11	.05
Canton, O.	65	.06	.105	.045
Ambridge, Pa.	49	.06	.10	.04

Many Ovens Are Awarded

IN connection with the proposal of the government to stimulate additional construction of by-product coke plants in order to increase the supply of high explosive bases, plans for the building of 538 additional ovens of the Koppers type are announced. The proposal of the government to bring about the construction of 1500 additional ovens in which it will have a financial interest, was outlined in last week's IRON TRADE REVIEW.

Principal in importance as to size and capacity is the new plant of 300 ovens for which contracts have been awarded to the H. Koppers Co. by the Jones & Laughlin Steel Co. This plant will be located at the Eliza furnace department and will have a carbonizing capacity of approximately 2,000,000 tons per year and will replace beehive coke capacity to that extent. The plant will be equipped for the recovery of ammonia in the form of ammonium sulphate, of tar and of benzol and of toluol as pure products. The ammonium sulphate and pure toluol will be sold to the government for war purposes. The company will use the gas in its steel plant operations.

The recent announcement of the incorporation of the Fairmont By-Products Corp., Fairmont, W. Va., means the construction of a new by-product coke plant. The H. Koppers Co. has received a contract for the construction of 110 ovens with the necessary boiler capacity and accessories. Ammonia and sulphate and pure toluol for government purposes and tar and benzol for general industrial use will be produced. The plant also will deliver a large amount of coke oven gas to the relief of the shortage of natural gas in the Fairmont district. A site for the plant has been selected near Fairmont and a number of houses will be built for employes.

Recent announcement is made that the H. Koppers Co. will build two more batteries of by-product ovens, totalling 128 ovens, for the large plant of the Carnegie Steel Co. undergoing construction at Clairton, Pa. In addition to the 640 ovens of this plant which are about to begin producing, another unit of the same size is under way so that finally there will be 1408 ovens in the plant. This will be the largest in the world. It will require approximately 10,000,000 tons of coal annually, and will produce about 6,500,000 tons of coke in that period. The output of by-products annually will be, roughly, 22,000,000 gallons of tar, 65,000,000 cubic feet of gas, 28,000,000 pounds of ammonium, and 64,000,000 pounds of ammonium sulphate.

Made Resident Manager

A. O. Sonne has been appointed resident manager for Rogers, Brown & Co., at Chicago, succeeding E. L. Billingslea recently deceased. Mr. Sonne has been associated with this interest in the Chicago field for the past 18 years, and has a wide acquaintance with the trade.

War Business to be First

Heavy Hardware Association Pledges Sales to Essential Requirements—Seek Priority to Replenish Steel Stocks

An accurate and complete accounting of all steel used by members of the American Iron, Steel and Heavy Hardware association, was urged by Samuel L. Orr, chairman of the war service committee, at the annual convention held at Atlantic City, May 21 to 23. He stated that aside from such action being a patriotic duty, it will serve to determine whether or not members are to be further favored when the time comes for additional restrictions by the government. In applying for priority certificates, Mr. Orr said that it is incumbent upon members to consider carefully whether the material will be used effectively in helping to win the war and if not, they will succeed only in damaging their own case.

In commenting further, Mr. Orr said: "It is the belief of the war service committee that the acute scarcity of steel, will apply more particularly to plates, large rounds, etc., required in shipbuilding and in munitions manufacture. There is little to the production of any one given class of material so that all steel could not be used in its manufacture and there would be tonnage available for other steel items in which the situation might not be so serious. It is our information that the priority board is disposed to consider applications for priority certificates for stock and also to recognize when tonnage justifies a government order number for replenishment. We jobbers are in a peculiar position since we do not have available the government order numbers or know accurately the ultimate uses of our steel at the time we place orders. Unless we are able to secure some preference our stocks are bound to become depleted and our service to our customers impaired. In making application for priority, which must be made out on regular blank, it is necessary to state the uses to which the material will be put as laid down by the regulations."

As to the committee's effort in connection with extras, Mr. Orr stated: "Your war service committee has endeavored to secure uniformity of practice in the matter of warehouse steel extras—in some localities full extras are added, in others 'mill extra' is used and still in other communities so-called 'warehouse extra' prevails. We recommended as a compromise that 'warehouse extra' be used universally but so far we have been unsuccessful in securing its establishment. If there is any justification for mills to charge extra for certain sizes on account of higher costs or limited sale, these same reasons would entitle the distributor to an extra profit as well. Our arguments were met with the assertion that the fixed spread of profit allowed to jobbers was purposely made larger to cover this extra and that therefore 'mill extra' should be used on all the larger warehouse business."

E. A. S. Clarke, secretary of the steel and steel products committee wired his regrets at being unable to attend the meeting. He expressed appreciation of the fine spirit of co-operation that was manifest in the association's observance of the price fixing regulations. He took the opportunity to assure warehouse men and jobbers that they would receive their fair proportion of steel products based upon the extent of their war business.

At the close of the convention, the members passed a resolution pledging themselves to sell first for direct and indirect requirements of the government and second for essential uses as may be directed by the priorities division.

The following officers were elected for the ensuing year: President, F. H. Butts, Butts & Ordway Co., Boston; first vice president, W. H. Grant, Bonniwell-Calvin Iron Co., Kansas City, Mo.; second vice president, S. L. Orr, Orr Iron Co., Evansville, Ind.

Grenade Orders

Now Are Being Shifted From Malleable to Gray Iron

Washington, May 28.—Gray iron as recently stated by THE IRON TRADE REVIEW is to supplant the malleable iron in large orders for hand grenades about to be placed by the war department, according to information now developed in official circles here. Not only is the new order to require gray iron, but those grenades yet to be made on the first orders which approximated 40,000,000 grenades are to be of gray iron also. This change has been urgently requested by General Pershing. Malleable foundries equipped to make the grenades of gray iron may retain their order, making the substitution, but those not so equipped likely will have to give up the contracts.

The Non-Ferrous Metals

Copper **Lead** **Spelter** **Tin**

	*Copper	†Spot Straits, tin	‡Lead, New York basis	Spelter St. Louis basis	**Aluminum	Spot antimony
May 22	23.00	.....	6.92½	7.30	32.00	12.00
May 23	23.50	.....	6.97½	7.25	32.00	12.00
May 24	23.50	.....	6.97½	7.25	32.00	12.00
May 27	23.50	.....	6.97½	7.25	32.00	12.00
May 28	23.50	.....	7.05	7.20	32.00	12.00

*Government fixed maximum price for prime lake, electrolytic and casting copper, in ingots, pigs, slabs, etc., less than carloads, 24.67½c.
†No spot Straits tin offering.
‡Outside market, prompt shipment.
**Government fixed price for 98 to 99 per cent ingot aluminum in 50-ton lots; lots 15 to 50 tons, 32.10c; one to 15 tons, 32.20c.

New York, May 28.—President Wilson has approved the agreement between the war industries board and the producers of zinc, fixing a price of 12c a pound for grade A zinc, f. o. b. East St. Louis, the agreement to be operative from June 1 to Sept. 1, 1918. Prices for other products were 14c a pound for plate zinc, f. o. b. plant, and 15c for sheet zinc, subject in both cases to the regular differentials, extras or discounts, that were in effect Feb. 13, 1918.

No official announcement has yet been made of the conclusions reached by the war industries board following recent conferences with representatives of copper producing companies, but it is generally reported the board has recommended the continuance of the present 23.50c maximum price for 75 days, or until Aug. 15.

The market for Chinese tin has declined the past week. A week ago May shipment from China was held at 98.50c to 99c. Today there are offerings of this position at 87c to 88c. Spot on the Pacific coast is held at 92c to 93c. Banca for reasonably early shipment from Batavia is held at 92c to 93c, subject to conditions and Straits for June and July shipment from Singapore is nominally quoted 92c to 93c. No spot Straits or Banca is reported available.

The market for prime western spelter has eased slightly, sales for prompt shipment now being reported at 7.20c, St. Louis.

The lead market is firmer, outside holders are now quoting a parity with the leading interest's price, 7c to 7.10c, New York.

The antimony market is inactive.

Design and Layout of Condensers

Pointers on the Selection of the Proper Condenser Installations Under Various Conditions—Auxiliaries and Cooling Facilities Are Important Considerations in Choosing Equipment

BY D. D. PENDLETON

THE types of condensers are surface, jet and barometric. For high duty work, 28-inch vacuum or better, the type of condenser to be selected should be studied, taking into consideration the engineering, physical and commercial conditions, and particularly the question of water with respect to quantity, quality (clean, dirty, acid, etc.), pumping head; source (natural or artificial) and average temperature.

From these points may be determined the commercial vacuum which it is practicable to maintain, always bearing in mind that the average log of a properly designed, rated and operated surface condenser will show a better vacuum than a jet machine, and the latter in turn better than a barometric machine, due principally to the conditions as to air leaks, air to be handled by air-pump and exhaust piping losses. The surface machine also reclaims the condensate in the shape of pure distilled water for boiler feed, thus requiring only a moderate amount of make-up water.

In some localities the choice of condenser is determined by a practice of long standing, or by prejudices, and sometimes without investigating all phases of the situation. Pittsburgh and vicinity for a long time had the barometric habit, this perhaps being due to the fact that the manufacturers of mill equipment, in a great many cases had only the barometric to offer. Later the low type or centrifugal jet condenser appeared and was advocated for the same reason, the surface condenser usually being condemned without a hearing. Now the operating engineers are studying their own problems, and in most cases using the type best suited to conditions. After considering all the possible factors which have been mentioned above, and which apply to each individual case, the choice of a condenser should be made according to the power requirements and operating cost.

Assume a case of 40,000 pounds of steam per hour, 28-inch vacuum, based on 30-inch barometer, and temperature of water 70 degrees Fahr. The power requirements under these conditions will vary.

The water required for a surface condenser is usually based on 15 degrees difference and for this case would require 5000 gallons per minute. Since the discharge should be sealed in order to obtain the benefit of the siphon effect, a head of 10 feet should be ample under ordinary circumstances. This would require a water horsepower of 12.5, and with an efficiency of 75 per cent on the centrifugal pump, a total pumping horsepower of 16.66 would be required. Using the wet and dry system the air-pump would require approximately 6 horsepower and the condensate pump about 2½ horsepower, or a total of approximately 25 horsepower. If a turbo air and condensate pump were used, 40 horsepower would be required, making a total of approximately 56.66 horsepower.

The water requirements of the low type jet condenser can be figured at a temperature difference of five degrees. This will require less water than the surface condenser, or 3100 gallons per minute. The efficiency of the tail pump or removal pump on any jet condenser should not be figured at more than 50 per cent. In some cases it has been known to go as high as 60 or 65 per cent. This however, is extreme. A total pumping head of 36 feet is usually figured, this being the discharge head from the condenser, plus friction at the tail pump nozzle, which in this case would require approximately 27.9 water horsepower. At 50 per cent efficiency a total of 55.8 horsepower would be required for the removal pump alone. The direct-acting, reciprocating air-pump would be twice as large as for the surface condenser and would require about 12 horsepower, making a total of 68 horsepower for the jet system. If a turbo air-pump were used, 55 horsepower would be required, instead of 12 for the reciprocating pump, making a total of 111 horsepower.

The barometric condenser will require the same amount of water as the jet type, but the water may be lifted to the condenser head against the total static head, from which may be subtracted the suction effect of the vacuum. With the source of the water at approximately the same level as the hot-well discharge the net head on the barometric can be considered at 30 feet, making a total of 23.25 water horsepower. The efficiency of the supply pump should be at least 70 per cent, making a total of 33 horsepower for same. The air-pump being the same as for the jet, namely, 12 horsepower for the reciprocating, direct-acting pump and 55 horsepower for the turbo

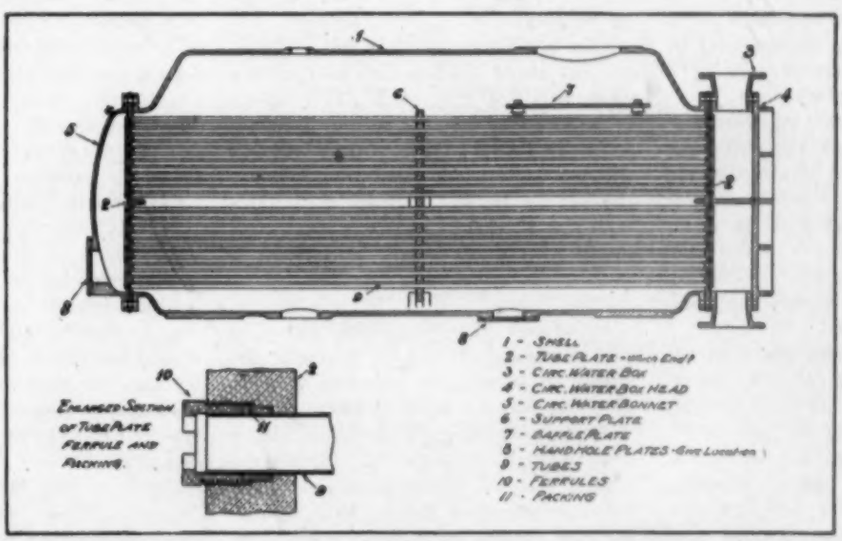

1 - Shell
2 - Tube Plate
3 - Circ. Water Box
4 - Circ. Water Box Head
5 - Circ. Water Bonnet
6 - Support Plate
7 - Baffle Plate
8 - Hand Hole Plates
9 - Tubes
10 - Ferrules
11 - Packing
Enlarged Section of Tube Plate Ferrule and Packing.

FIG. 1—GENERAL ARRANGEMENT OF A STANDARD SURFACE CONDENSER

From a paper presented at a recent meeting of the Engineers' Society of Western Pennsylvania. The author, D. D. Pendleton, is district sales manager of the Wheeler Condenser & Engineering Co., Pittsburgh.

air-pump, would make the totals 45 and 88 horsepower, respectively. The steam-pump would materially increase the air jet in place of the previously mentioned air-removal power requirements.

There is no limit to the size of surface equipments—they are now being made in sizes from 100 square feet up to 70,000 square feet. The barometric is limited owing to the expensive exhaust piping for large units. The low level jet is also limited as to size, due to the removal or tail-pump and air-pump limitations and the power required for driving them. The practical limit for these two types seems to be 7500 to 10,000 kilowatts, although there have been installed in certain cases twin jets on machines up to 45,000 kilowatts. This was not through any engineering or practical condition, but principally a matter of personal preference.

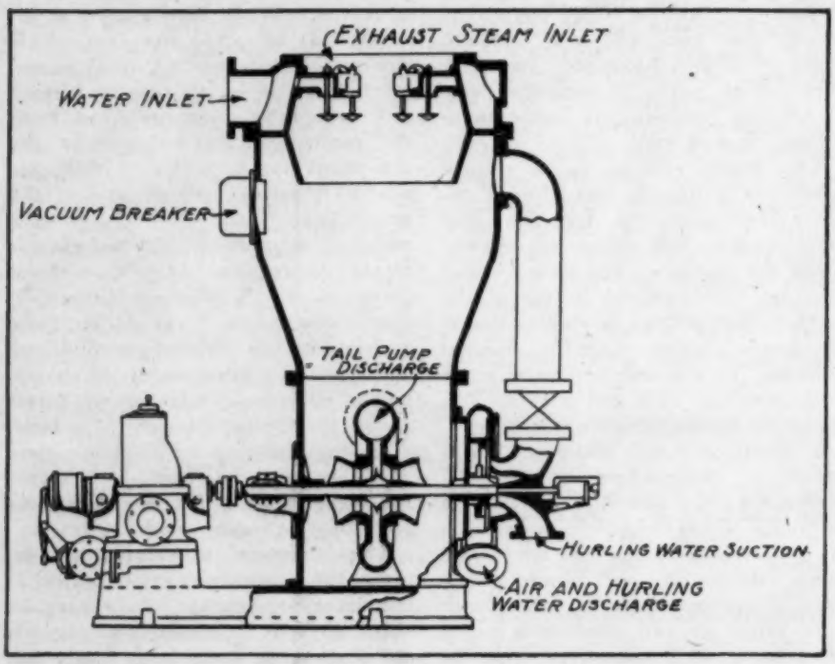


FIG. 2—SECTION SHOWING A LOW-HEAD JET CONDENSER WITH TURBINE DRIVEN INTERNAL SUBMERGED TAIL PUMP AND TURBO AIR PUMP

For example, a 20,000-kilowatt turbine at 12.5 pounds per kilowatt-hour, or 250,000 pounds of steam, would require at 15 degrees difference for surface work 31,250 gallons of water per minute at 70 degree water and 28-inch vacuum, against a 10-foot head. This would require approximately 100 horsepower.

The air and condensate pump of the hydraulic type requires 140 horsepower additional, or a total of 240 horsepower with one set of auxiliaries only. These can be duplicated, using one set as spare auxiliary equipment. If the wet and dry system is used the air-pump and condensate pump will only require 56 horsepower, making a total of 156 horsepower.

The jet at a 5-degree difference would require 20,000 gallons of water per minute against a 40-foot head if no booster pump were required, or approximately 400 horsepower. The air-pump would require about 250 more, making a total of 650 horsepower. The auxiliaries would have to be in pairs, with no possibility of having spares in reserve. There is no single dry vacuum pump manufactured large enough for this service.

The development of the steam turbine during the past few years has been so rapid and the vacuum requirements by the manufacturers so severe in order for them to make certain guarantees as to economies, that condenser requirements have been slighted in order to obtain a specified vacuum. For this high duty, which is required in most cases, a hardship as to first cost and operating cost of the condenser has been placed upon the purchaser, and it is in most cases doubtful if the overall efficiency will justify this extra cost.

Turbine Design

It should also be borne in mind that a turbine should be specially designed as to the low pressure blading, so as to handle without undue throttling the enormous volumes of steam due to high vacuum. If not so designed a back pressure is set up in the low pressure stages, thus defeating the results even though the condenser is designed for that specific duty. The failure to maintain specified overall duty is in most cases blamed on the condenser.

After fixing the type of condenser to be used the next step should be a study of the auxiliaries for the equipment. These can be divided into two kinds, motor-driven and steam-turbine or engine-driven. It is easy to analyze the power requirements of the motor-driven air-pump, circulating pump, hot-well pump, etc., power being taken from the switchboard and representing power not available for sale or other use.

The steam-turbine or engine drive, however, brings up the question of the return of heat to the feed-water, or heat balance, which often so complicates matters that the true power consumed is overlooked. Roughly, 90 per cent of the steam heat of the auxiliaries will be returned as heat to the feed-water, provided there is enough water of a suitable temperature to absorb this heat. The amount of feed-water available for absorbing this heat varies with the load of the main unit. The result is that at times of light load there is a grave danger of showing an excess of exhaust steam. This militates to some extent against the use of steam-driven auxiliaries, and has led to the development of combined drives using turbines and motors. Another feature to be taken into consideration is the growing use of economizers in connection with the boilers; the colder the water the more work is done by the economizers. This also emphasizes the need of avoiding an excessive amount of exhaust steam. These conditions have drawn attention to the economy of auxiliary turbines, and this in turn has resulted in the use of high-speed turbines with reduction gears.

Air-pumps are divided into several classes, as follows: The direct-acting wet pump; the flywheel direct-acting wet pump; the direct-acting rotative low speed dry vacuum pump; the hydraulic or turbo air-pump; and the steam-jet pump.

The old type direct-acting wet pump is usually a standard steam-driven pump, sometimes of the suction valveless type. This cannot produce above a 26-inch vacuum.

The rotative or flywheel direct-acting wet pump is similar in type to the Edwards, Mullen, etc. All these have their good qualities but produce a vacuum of less than 28.5 inches under any conditions, and they are limited in size and capacity, being impracticable for over 40,000 pounds of steam per hour with a 28-inch vacuum. They are rarely used except for surface work.

The direct-acting rotative low-speed

dry vacuum pump, when used with a proper condensate pump, is really the most efficient in point of power consumption, and where space is available is practicable up to about 250,000 pounds of steam per hour with a 28-inch vacuum, but for jet or barometric work at the same vacuum for only about one-half that amount of steam.

The hydraulic or turbo air-pumps, such as the Leblanc, or other types, are very generally used and, although large consumers of power, they are well adapted to all types of work where economy of space, convenience of arrangement and layout make them more practicable.

The steam-jet has so far been confined principally to marine and ice-machine work, by reason of the high steam consumption. A steam-jet using 1600 pounds of steam per hour from tests, shows an air-handling capacity of about 13 cubic feet of free air per minute at 1.5 inches partial pressure. This means on the same basis nearly 4 per cent of the main unit power. The hydraulic pump using the same amount of steam with turbine drive would handle about 32.5 cubic feet of free air per minute under the same conditions. A rotative, dry vacuum pump of the same capacity, 32.5 cubic feet per minute, would require about 900 pounds of steam per hour, with a steam pressure of approximately 100 pounds.

Choosing an Air Pump

In specifying an air-pump, due consideration should be given the requirements under winter conditions with cold water. If condensing equipment is designed for a 28-inch vacuum with 70-degree water, the purchaser should reasonably expect a corresponding vacuum with colder water. With water at 35 degrees for surface work the theoretical vacuum, based on a 15-degree difference, with a properly designed machine, should produce a 29.354-inch vacuum, and the same for barometric or jet condensers based on a 5-degree difference. Such a guarantee can be made only by designing and furnishing a decidedly abnormal air-pump or air-handling equipment.

Condensate pumps are of the single or two-stage standard centrifugal, steam-turbine or motor-driven or of the direct-acting duplex type, with some means of control such as a float to insure continuous supply of water to the pump. Circulating or supply pumps are usually of the centrifugal type, turbine or motor-driven, or a combination of both.

The surface requirements depend upon the amount of water available, or the advisable amount to be pumped from an unlimited supply, the temperature and the rate of heat transfer per square foot of surface per mean degree of temperature difference. This rating as to surface depends principally upon the amount of heat that can be dissipated by each square foot of surface. This is determined by the heat transfer per degree difference between the mean temperature of the circulating water and the temperature of the vacuum attempted. With a vacuum of 28 inches, having a temperature of 101 degrees Fahr. and with 70-degree water at a 5-degree difference (that is, a final water temperature 5 degrees below the temperature of the vacuum), there is a 26-degree rise or 13 degrees mean temperature rise, giving a mean water

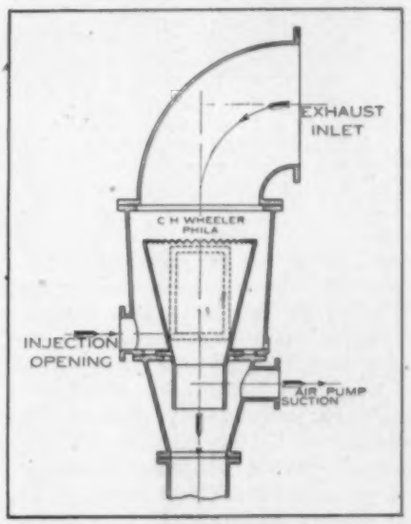


FIG. 3—SECTION OF BAROMETRIC EJECTOR CONDENSER HEAD

temperature of 83 degrees Fahr., or 18 degrees mean temperature difference. Assuming 300 B. t. u. heat transfer per mean degree difference, each square foot of surface should then absorb 5400 B. t. u.

At 10 degrees difference there is a 21-degree rise, or 10.5 degrees mean rise, or a mean water temperature of 80.5 degrees. This constitutes a mean temperature difference of 20.5 degrees, which at 3000 B. t. u. heat transfer would require each square foot of surface to absorb 6150 B. t. u.

At 15 degrees difference we have 16 degrees rise, 8 degrees mean rise, 78 degrees mean water temperature, 23 degrees mean temperature, difference at 300 B. t. u. heat transfer, or 6900 B. t. u. per square foot.

At 20 degrees difference we have 11 degrees rise, 5.5 degrees mean rise, 75.5 degrees mean water temperature, 25.5 degrees mean temperature difference at 300 B. t. u. heat transfer, or 7650 B. t. u. per square foot.

The water quantities for each pound of steam at 1000 B. t. u. per pound would be in the above cases 38.5, 47.6, 62.5 and 90 pounds, respectively.

At high vacuum the specific volume of steam becomes enormous; 339.6 cubic feet for a 28-inch vacuum, and 1259 cubic feet for a 29.5-inch vacuum, and the addition of surface or baffles to a condenser of ordinary design may entirely defeat the purpose of the designer because of the increased resistance to the flow of steam between the tubes and through the condenser. Particular attention should therefore be paid to providing steam lanes, and to the proper arrangement of tube banks, so as to keep down this resistance of flow to a minimum. In some cases removal of 10 to 20 per cent of the tube surface has materially increased the vacuum.

Factors Which Determine Vacuum

The quantity of water available and the temperature usually determine the practical vacuum. This quantity can be varied for the same vacuum by varying the assumed terminal temperature difference, which will directly vary the surface for any given rate of heat transfer. A terminal temperature difference of 5, 10, 15 or 20 degrees and a ratio of heat transfer from 300 to 500 can be used. For standard commercial work a terminal temperature difference of 15 degrees is usually conceded to be the best practice, and a heat transfer of from 300 to 350 is the most conservative. This gives an idea of what may be accomplished in relation to water quantities, and of course if the surface be reduced in proportion to the

Table I

Capacity and Power Ratios

Station	Turb. capacity	Sq. ft. surf.	Sq. ft. per kw.
Waterside No. 2	22,000	25,000	1.14
Waterside No. 2	30,000	50,000	1.66
Boston Elevated	35,000	50,000	1.43
Gold Street, Brooklyn	22,000	35,000	1.59
Fisk Street, Chicago	25,000	40,000	1.60
Northwest, Chicago	30,000	50,000	1.66
Seventy-fourth Street, New York	30,000	50,000	1.66
Buffalo	20,000	33,000	1.65

rate of heat transfer (350, 400, 450 and 500 B. t. u. per mean degree difference) it will materially reduce the cost, but decrease the margin of safety for overloads and fouled tubes.

Ratio of Surface to Power

There has been much discussion regarding the surface per kilowatt. No condenser is ever rated by kilowatt, but by pounds of steam per hour, and in all cases the B. t. u. per pound of steam should be given. In a recent paper before the Boston societies a statement was made as to surface for certain installations, which is summarized in Table I. Other recent installations with the surface specified and guarantees are given in Table II.

Some engineers have advocated water velocities for surface condensers as high as 10 feet per second, stating emphatically that 8 feet is conceded to be practical and standard. Since from tests of a number of large condensers a water velocity of 4.7 feet per second seems to be the average, assume a velocity of 5 feet. Suppose that this velocity be increased to 8 or 10 feet, the excessive power requirements for such conditions will be apparent. Eight to 10 feet per second seems to be absurd in view of the fact that there are very few commercial plants in practical operation under this condition.

By plotting the curve of head lost in the condenser against the discharge in gallons per minute on logarithmic paper, it is found that the head lost varies as the 1.75 power of the discharge; but since the velocity varies directly as the quantity of water, the head lost varies according to the 1.75 power of the velocity. This exponent is but slightly lower than the exponent 1.87, given in the American Civil Engineers' pocket book, or the exponent 2 generally conceded an average value. As the water horsepower depends upon the quantity times the head, the horsepower should vary as the cube of the velocity. It is found, by plotting the water horse-

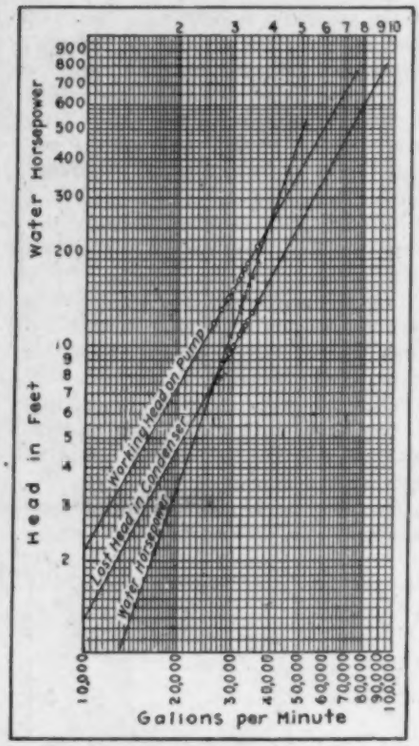


FIG. 4—CURVES OF CENTRIFUGAL PUMP TEST

power curve that the exponent is 2.9. That is, the horsepower varies as the 2.9 power of the gallons per minute, or of the velocity through the condenser tubes. Assuming a water velocity of 5 feet per second and 30,000 gallons per minute, by increasing this velocity to 10 feet per second the head loss in the condenser would be 35 feet, making a total head of 52 feet, instead of 10 and 15 feet; and a water horsepower of over 800, instead of 112.

Low Level Jet Condensers

Water quantities are usually figured at a 5-degree terminal difference as standard practice, although results have easily been obtained at the temperature of the vacuum or at 100 per cent water efficiency. The removal or tail-pump requires the larger amount of power. With the usual river conditions the water has to be supplied to a cold well by a booster pump, drawn into the condenser by suction, and expelled against the vacuum plus any friction and outside static head. The booster pump power has not been considered in the example of power requirements for the types already given. The air-pump is required to remove air coming in with the water, as well as air entering through leaks in the exhaust or other piping, and air entering with the steam.

Barometric Condenser

With the barometric condenser also the water quantities are figured as in the low type jet machine. The water supply can be more easily obtained in that it can be pumped directly to the barometric head without booster or auxiliary pumps. The air-pump requirements are the same as in the low type jet. The efficiency of the booster pump for the low type jet, when required, and of the supply pump for the barometric can be assumed as standard, consistent with good centrifugal pump design at a given head and quantity. But the removal pump efficiency for the jet is seldom over 50 to 60 per cent, owing to the low velocity of the entering water in the impeller when pumping from a vacumm. The barometric type, therefore, as far as power requirements are concerned, is more efficient than the jet and less efficient than the surface type. No condensate is reclaimed for boiler-feed purposes in either case.

Where water supply is a serious problem some artificial method of cooling a given supply of circulating water is employed. This is done by some kind of cooling tower or spray pond. Cooling towers are of the natural-draft, enclosed type, the natural-draft, open or rack type; the forced-draft; or the combined forced and natural-draft.

In standard cooling tower practice it has been determined that with the air temperature at 75 degrees Fahr. and at 70 per cent relative humidity, the most economical vacuum to attempt is 27 inches, based on a 30-inch barometer, or a vacuum having a temperature of 115 degrees Fahr. Rating all three types of condenser on a 5-degree difference, requiring a minimum uniform amount of water, it will be necessary to cool the water from 110 degrees Fahr. Commercially, under the given air conditions, it has been found practicable to cool to only 85 degrees Fahr. or sometimes to 80 degres Fahr., giving a 25 or 30-degree cooling range, which with steam at

Table II

Specified Surface and Guarantees

Turbine cap. kw.	Sq. ft. surface	Surface per kw. sq. ft.	Lb. st. per hour	Vacuum guar. in.	Temp. cir. water deg. Fahr.
10,000	19,000	1.90	125,000	28.00	75
20,000	44,000	2.20	240,000	28.50	75
10,000	20,000	2.00	130,000	28.20	70
10,000	25,000	2.50	135,000	28.00	80
20,000	40,000	2.00	220,000	28.50	70
15,000	35,000	2.33	200,000	27.25	80
20,000	35,000	1.55	260,000	27.25	85
20,000	35,000	1.75	268,000	27.00	83
25,000	45,000	1.80	285,000	28.00	75
30,000	45,000	1.50	385,000	28.40	70
15,000	26,000	1.73	190,000	28.00	70
30,000	60,850	2.02	345,000	28.50	70
15,000	26,300	1.75	147,000	28.55	70

1000 B. t. u. per pound would require 40 to 33.3 pounds of water per pound of steam, respectively.

The type of equipment will depend upon existing local conditions, such as space available and power consumption. The natural-draft open type requires more ground space and can be placed only where the vapors and driftage will do no harm to surrounding buildings or property. This type requires a pumping head of approximately 30 feet and no other power. The natural-draft, enclosed chimney type takes less ground space The chimney or stack is usually about 75 feet high. This causes a positive draft at all times. A pumping head of about 25 feet is required and the system is practically independent of wind conditions. The forced-draft type requires less floor space than any other type, but requires a pumping head of about 30 to 35 feet, and an additional amount of power for driving the fans, giving a draft independent of atmospheric conditions. The combination forced-draft and natural-draft tower requires less floor space than the chimney type natural-draft machine and more than the forced-draft machine, and requires about the same pumping head as the natural-draft chimney type machine, plus the power to drive the fans when operating under forced-draft conditions. This type has the advantage of conservation of power under favorable atmospheric conditions.

Layout of Spray Ponds

It is impossible to state generally the area of a pond required for a given quantity of water, but, generally speaking, at a working pressure of six to seven pounds on the spray nozzles, a pond of three square feet per gallon of water sprayed will be necessary. There are quite a number

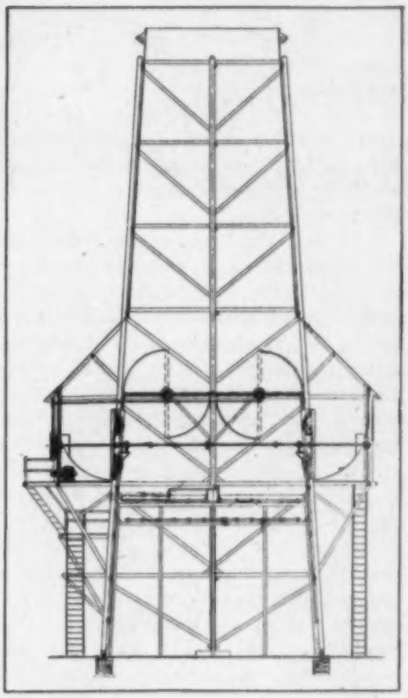


FIG. 5 — SECTION OF COMBINATION NATURAL AND INDUCED DRAFT COOLING TOWER

of details to be considered, all having vital bearing on the subject of spray nozzle cooling. First, for spray nozzles the cooling effect can be increased by increasing the pressure at the nozzle. An increase of from 5 to 20 pounds would show an increase of from 1 to 12 per cent in cooling. The size of the nozzle should also be considered. Assuming a given size nozzle as rated at 100 per cent, an increase of up to 135 per cent can be obtained by decreasing the size, while by increasing the size a decrease of 60 per cent will be shown in the rated efficiency or cooling effect. The size of the pond or its storage capacity is a very valuable asset, in that the greater the storage volume the more time it requires in continuous service to pass it through the condenser. This time is what is called the lag in the pond temperature. The greater the lag the lower will be the average temperature in the pond. Therefore, the mean atmospheric conditions over the lag period can be assumed. Sprays are usually arranged in groups, so that free access of the air can be obtained at all times. The groups are arranged in single or double deck, depending upon the space conditions.

Natural Cooling Ponds

The area of a natural cooling pond obviously should be large, as the heat dissipated per square foot depends upon the relative humidity, the temperature of the water and the velocity of the air currents. These are naturally, on account of varied conditions, very discordant.

Quoting from G. F. Gebhardt's "Steam Power, Plant Engineering":

"It appears from tests that under ordinary conditions, in the northern part of the United States, with engines using 15 pounds of water per horsepower hour and a vacuum of 26 inches, a reservoir having a surface of 120 square feet per horsepower would be ample for cooling the condensing water."

This would mean about 60 square feet for each gallon of condensing water for a 26-inch vacuum, which, of course, would be greatly increased for a higher vacuum. The advantages are, of course, with spraying under pressure. In any water-cooling device 90 per cent of the cooling effect is through evaporation, and it is therefore of vital importance that sufficient unsaturated air be given free access to the proper quantity of water. The air in all cases should go off the tower or pond in a saturated condition.

Structures of Acetylene and Arc Welds

IN this contribution Zay Jeffries, instructor in metallurgy, Case School of Applied Science, Cleveland, discusses S. W. Millers' paper entitled "Some Structures in Steel Fusion Welds" which was presented at the annual meeting of the American Institute of Mining Engineers. Mr. Miller's paper was published in the March 21 issue of THE IRON TRADE REVIEW. Mr. Jeffries says:

"I have had occasion to study the structures of acetylene welds, as well as arc welds used in various welding materials. Regarding the formation of the needles, I am of the opinion that they are not cementite. Their etching characteristics are not at all like the etching characteristics of cementite, either with picric acid or other reagents. If they were cementite, they should remain brighter than the surrounding material when etched with picric acid, and darker than the surrounding material when etched with sodium picrate."

The formation of the free cementite under the stated conditions disobeys the phase rule so completely that I think we might almost discard the idea of free cementite at once. I realize, of course, that the formation of cementite globules disobeys certain features of the phase rule, and that the phase rule is not what we want to go by—we want to go by facts—but let us see what those needles would have to do in order to form in the free cementite under the conditions existing during the cooling of that weld.

Ferrite, not cementite, should separate at the grain boundaries first, and then if diffusion cannot take place rapidly enough, the ferrite should begin to separate in the cleavage planes of the austenite. The cementite would remain

in solution in the steel until it concentrated to 0.9 per cent in carbon, and then should form either pearlite, sorbite, troostite, or martensite, according to the rate of cooling. For the cementite to form in the free needle state under those conditions would be contrary to all laws of phase equilibria now recognized. But we do not need to consider that the needles are free cementite in order to explain its occurrence.

Rate of Cooling Compared

The formation of those needles will vary with the rate of cooling, through the critical range. The acetylene weld cools much more slowly than the electric weld. That is due to the fact, as Mr. Miller has mentioned, that the acetylene torch heats large adjacent areas of the steel to be welded, whereas in the electric weld a small portion of the steel is heated; the rest of it remains comparatively cold. The needles occur only occasionally in the acetylene welds I have examined. In the electric welds the needles are most prominent.

Osmond found that steel containing as little as 0.10 to 0.12 per cent of carbon, when quenched a little above the upper critical range, produced only a little martensite, but when quenched from 1200 to 1300 degrees produced more martensite. We have the condition, in these electric welds, of quenching from the melting point, or 1500 degrees. We have the second condition of a lower carbon content.

If those needles were cementite, the area represented would be sufficient to produce steel of 0.6 per cent carbon so that their quantity is out of proportion to the quantity of cementite which could form. We know nothing about the limiting side of martensite from the low-carbon end. I have made welds containing fairly high carbon and would always get martensite, and they are hard. The electric welds, therefore, cooled fast enough to produce martensite, when there is enough carbon to recognize martensite in its familiar form. If we decrease the carbon content gradually, where is the formation of that martensite going to stop? I cannot say that there is a point between 0.10 and 0.09 per cent carbon above which we will get martensite, and below which we will not.

I believe that the needle structures (the ones which I have examined at any rate) have a direct bearing on the formation of martensite. The needles are in the same direction and position as the martensitic needles, and all of the needless which Mr. Miller has discussed are in the cleavage planes of the austenite grains. So are martensite needles in the cleavage planes of the austenite, etc. As we increase the grain size of the austenite from which the martensite was formed, we make the needle structure more and more pronounced, but as we decrease the carbon content may we not increase the distance between needles; and if we reduce the carbon very low, may the distance between needles not be something on the order of that which is found in the electric welds?

Relation of Needles

I have another reason for supposing that those needles relate particularly to the formation of martensite, namely, the material in that condition is harder than it is after being heated above 900 degrees and cooled in the furnace; or, in other words, even though the grain is smaller after grain refinement, the hardness seems to be less.

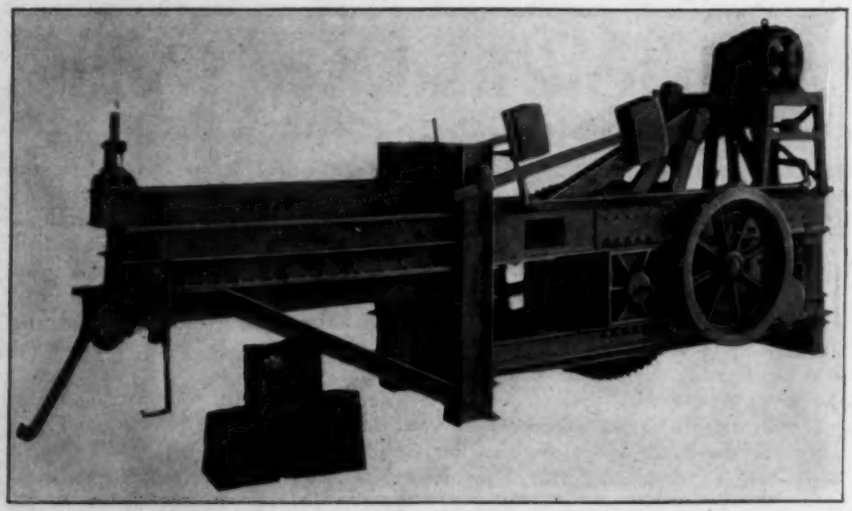
I wouldn't attempt to say why the martensite looks as it does. Nobody knows what martensite is; nobody knows how many needles, side by side, we must have before we can call it martensite; nobody knows how far apart those needles must be in order to call the material martensite. In other words, most of our work on martensite has been with steels containing more carbon than these steels with which Mr. Miller has been working. There is no reason, however, why the formation of martensite should not be gradual, from zero carbon up to the highest quantity of carbon. The conditions noted by Mr. Miller, namely, the speed of cooling, high temperature previous to cooling, the increased hardness, the position of the needles being the same as the position of the needles of ordinary martensite, and the softening of the weld by annealing, all tend to give one the idea that those needles are of martensite origin.

One thing more about the nitride. Why should any nitride form in the few seconds in which the electric-welded steel is heated to the high temperature, when oxygen is so abundant? That is, we should have to use up the oxygen before the nitrogen would begin to act; and the evidence is that the oxygen has been active. Then, as yet, we have no evidence that the nitride of iron can be broken up by heating it above the *Ac* point; however, this needle structure can be, and so can martensite.

I have suggested to Mr. Miller that if the needles are martensite they should be broken up by heating below Ac^3. This would also be the case if they were lines of deformation. I am of the opinion that if these needles be considered as lines of deformation that martensite needles should be considered as substantially the same thing.

Baling Scrap Metal

Considerations of economy in storage, handling and shipping demand that scrap metal, particularly light material, should be compressed to occupy the least possible space. Scrap steel from punching and stamping machines, wire and turnings are all bulky and inconvenient to handle in the condition in which they come from the machines. Baling in some form of press has been found to be the most practical method of reducing the bulk of these forms of scrap. The resulting bales bring better prices on the scrap market. The baler shown in the accompanying illustration therefore has a practical application. The loose metal is placed in the trough shown at the left and the plunger arm, actuated through gears by the motor shown on the elevated platform, moves forward and "cabbages" the metal with one stroke. The arrangement of hinged wings attached to the end of the plunger or piston, together with the tapered sides of the compression box, result in the pressure being applied on all sides of the loose metal in the compression box. This pressure is said to be in the neighborhood of 1000 tons. The scrap is compacted into a block or billet which may be handled and stored conveniently.



MOTOR-DRIVEN MACHINE FOR BALING LIGHT SCRAP METAL

Kaiser Blackmails German Industry

Iron and Steel Manufacturers Forced to Pledge Large Sums to Support Hohenzollern War Policy—Promised Great Holdings in Conquered Territory and Financial Backing in Return for Their Help

BY HERR THYSSEN

I AM writing this pamphlet because I want to open the eyes of Germans, especially of the business community, to facts. When the Hohenzollerns wanted to get the support of the commercial class for their war plans, they put their ideas before us as a business proposition. A large number of business and commercial men were asked to support the Hohenzollern war policy on the ground that it would pay them to do so. Let me frankly confess that I am one of those who were led to agree to support the Hohenzollern war plan when this appeal was made to the leading business men of Germany in 1912-13. I was led to do so, however, against my better judgment.

In 1912 the Hohenzollerns saw that the war had become a necessity to the preservation of the military system, upon which their power depends. In that year the Hohenzollerns might have directed, if they had desired, the foreign affairs of our country so that peace would have been assured in Europe for at least 50 years. But prolonged peace would have resulted certainly in the breakup of our military system, and with the breakup of our military system the power of the Hohenzollerns would come to an end. The emperor and his family, as I said, clearly understood this, and they therefore, in 1912, decided to embark on a great war of conquest.

But to do this they had to get the commercial community to support them in their aims. They did this by holding out to them hopes of great personal gain as a result of the war. In the light of events that have taken place since August, 1914, these promises now appear supremely ridiculous, but most of us at the time were led to believe that they would probably be realized.

Promises of Vast Conquest

I was personally promised a free grant of 30,000 acres in Australia and a loan from the Deutsch bank of £150,000, at 3 per cent, to enable me to develop my business in Australia. Several other firms were promised special trading facilities in India, which was to be conquered by Germany, be it noted, by the end of 1915. A syndicate was formed for the exploitation of Canada. This syndicate consisted of the heads of 12 great firms; the working capital was fixed at £20,000,000, half of which was to be found by the German government.

Voice of Steel Leader

AMERICAN iron and steel men especially are interested in the astounding revelations by Herr Thyssen of the methods used by the Hohenzollerns to bludgeon the commercial interests of Germany into support of despicable warfare. Herr Thyssen long has been one of the chief iron, coal and steel magnates of Germany and is well known to iron and steel leaders in the United States. With the British, French and German iron and steel associations, he visited this country in 1890. He was active in the proceedings of the international conference of iron and steel makers at Brussels in 1911, at which Judge Gary presided. He has been the owner of great docks and shipbuilding works at Vlaarindingen, near Rotterdam and has controlled the Vulcan Iron & Steel Steamship Building Co., of Germany. At the beginning of the war his holdings included mines, ironworks, docks and even harbors in British India, in British colonies, as well as in France and Russia, all of which were sequestered by these respective governments. He is 78 years of age. The pamphlet which he wrote attacking the Hohenzollerns in some way reached this country. Joseph G. Butler Jr. obtained a copy and has had reprints made from it to which he has given wide circulation. Herr Thyssen now is said to be in Switzerland.

There were, I have heard, promises made of a more personal character. For example, the "conquest of England" was to be made the occasion of bestowing upon certain favored and wealthy men some of the most desirable residences in England, but of this I have no actual proof.

Every trade and interest was appealed to. Huge indemnities were, of course, to be levied on the conquered nations, and the fortunate German manufacturers were, by this means, practically to be relieved of taxation for years after the war.

These promises were not vaguely given. They were made definitely by Bethmann-Hollweg on behalf of the emperor to gatherings of business men, and in many cases to individuals. I have mentioned the promise of a grant of 30,000 acres in Australia that was made to me. Promises of a similar kind were made to at least 80 other persons at special interviews with the chancellor, and all particulars of these promises were entered in a book at the trades department.

But not only were these promises made by the chancellor; they were confirmed by the emperor, who, on three occasions, addressed large private gatherings of business men in Berlin, Munich, and Cassel in 1912 and 1913. I was at one of these gatherings. The emperor's speech was one of the most flowery orations I have listened to, and so profuse were the promises he made that were even half of what he promised to be fulfilled, most of the commercial men in Germany would become rich beyond the dreams of avarice.

German Flag Over All

The emperor was particularly enthusiastic over the coming German conquest of India. "India," he said, "is occupied by the British. It is in a way governed by the British, but it is by no means completely governed by them. We shall not merely occupy India. We shall conquer it, and the vast revenues that the British allow to be taken by Indian princes will, after our conquest, flow in a golden stream into the fatherland. In all the richest lands of the earth the German flag will fly over every other flag."

"I am making you no promises that can not be redeemed, and they shall be redeemed if you are now prepared to make the sacrifices which are necessary to secure the position that our country must and shall occupy in the world. He who refuses to help is a traitor to the fatherland; he who helps willingly and generously will have his rich reward."

All sounded, I admit, tempting and alluring, and though there were some who viewed rather dubiously the prospect of Germany being able to conquer the world in a year, the majority of business and commercial men agreed to support the Hohenzollern war plans. Most of them have since wished they had never paid any attention to them.

According to the promises of the Hohenzollern, victory was to have been

achieved in December, 1915, and the promises made to myself and other commercial men in Germany when our money for the kaiser's war chest was wanted were to have been then redeemed.

But this is what has happened in reality: In December of 1916 the chancellor, Bethmann-Hollweg, began to have interviews once more with business men. The purpose of these interviews was to get more money from them. Guarantees were asked from 75 business men in Germany, including myself, that they would undertake to subscribe £200,000,000 to the next war loan. I was personally asked to guarantee a subscription of £200,000. I declined to give this guarantee; so did some others. I was then favored with a private interview with Bethmann-Hollweg's private secretary, who told me that if I declined to give the guarantee and subsequently the money I would lose on a contract I had with the war office. But not only that—I was threatened with the practical ruin of my business if I did not give the guarantee.

I described this demand as blackmail of the worst sort and refused to guarantee a mark to the war loan. Two months later I lost my contract, and the greater part of my business has been taken over at a figure that means confiscation. Moreover, I am not to get paid until after the war, but am to receive 4 per cent on the purchase price. Every man who declined to promise a subscription to the amount he was asked has been treated in the same manner.

The majority of men, however, preferred to pay rather than to be ruined, and so the Hohenzollerns in the main got their way. But, apart from the blackmailing of men who refused to pay any more money into the Hohenzollern war chest, let us see how the Hohenzollerns' promises are working out. A circular was sent out last March to a large number of business men by the foreign trade department which contained the following suggestion:

Preparing for the Reckoning

"It will be wise for employers who have foreign trade interests to employ agents in foreign countries who can pass themselves off as being of French or English birth. German agents and travelers will probably for some time after the war have difficulty in doing business not only in enemy countries, but in neutral countries. There will undoubtedly be a personal prejudice against Germans that would probably make it difficult for representatives of German firms to do business. Although this prejudice will not interfere with German trade, as it will be merely of a personal character, it will facilitate trading transactions if employers will employ agents who pass as French or English, preferably, or as Dutch, American, or Spanish."

So this is the prospect we are faced with after the war. The meaning of this circular in plain language is this: So loathed and hated have Germans become outside their own country that no one will want to have any personal dealings with them after the war.

A large number of businesses are, moreover, being secretly bolstered up with state aid. A condition of this aid is that the owners of the business receiving it shall agree to accept a considerable degree of state control over their business after the war. This is part and parcel of a plan on the part of the Hohenzollerns to get the commercial classes thoroughly into their grip before the end of the war, and so minimize the chances of a revolution.

These men who have agreed to accept aid now for their business, and state control after the war, have received a notification from the foreign trade department to the effect that, with proper organization, Germany ought to recover her pre-war trade three years after peace is declared. Here is the Hohenzollern method of redeeming promises. We are to get back our pre-war trade three years after peace is declared, and to do this we must submit to have our trading transactions controlled and supervised by the state.

Can any German to whom such prospects are held out by the emperor fail to see that he has been bamboozled and humbugged and fooled into supporting a war from which the utmost he can hope to gain is to come out of it without national bankruptcy?

Grinding Liberty Motor Cylinders

ONE of the important war problems that American manufacturers had to solve was the internal grinding of the new steel liberty motor cylinders to be used on airplanes. The grinding of ordinary gray iron or semisteel automobile cylinders caused little or no trouble because the metals used were comparatively soft and easy to machine. Also there was plenty of metal to stand up under the cut without great chances of distortion.

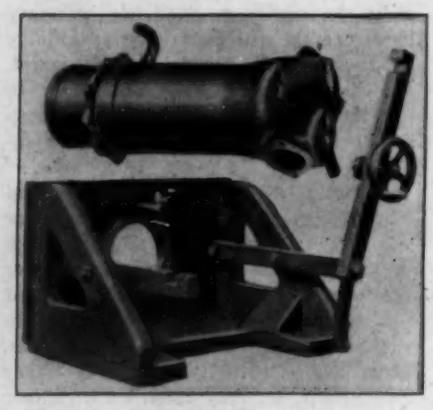


FIG. 1 — LIBERTY MOTOR CYLINDER AND GRINDING FIXTURE

But the thin, tough steel sleeve that was developed for the liberty airplane motors presented new and troublesome features, especially in the grinding operation. Of course, one object in the design was to get a motor of maximum horsepower per pound of weight and hence the cylinder walls had to be extra thin, necessitating the use of a tough, durable steel. Then, in addition to this, the diameter of the cylinder was increased somewhat over usual bores found in automobile cylinders, and the cylinders were lengthened out greatly, thus increasing the area of the ground surface materially.

These conditions coupled with strict requirements for accuracy and finish put a new problem up to the grinding machine and grinding wheel makers but they have it practically solved.

The cylinders are being ground on a Heald No. 60 cylinder grinding machine and also on Bryant internal grinding machines. The Heald company has designed a special fixture for holding these cylinders, as shown in Figs. 1 and 2. Fig. 1 shows the cylinder itself and also the fixture thrown open ready to receive a casting. Fig. 2 shows the cylinder in place in the fixture, ready to grind.

This fixture was designed to hold by

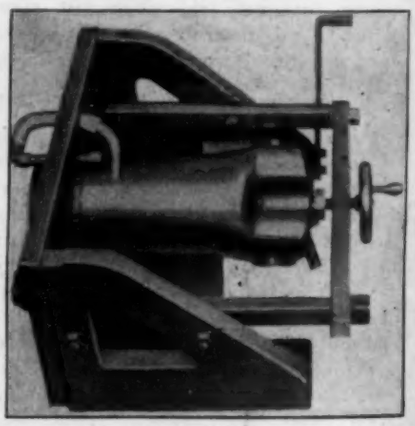


FIG. 2—CYLINDER IN PLACE READY FOR GRINDING

end pressure, thereby eliminating as much out of roundness and distortion as possible. The cylinder fits in a hole about 0.002 inch larger than the outside diameter, and has the flange pressed against the back of the angle plate by a loosely fitting collar on a screw turned by the small wheel at the rear.

Water is forced through the jacket from below and coming out at the top is carried by a hose and perforated pipe to the projecting skirt, which it runs over and envelopes completely, dropping off on the bottom of the cylinder. This keeps the cylinder always cool and even the skirt, within 10 seconds after a heavy cut, is cold.

The cylinders are made of special light yet tough steel, with the water jacket welded on.

There has been a slight difference in the grit and grade of grinding wheels that have been found satisfactory for this operation at the various airplane factories. This is undoubtedly due to the possibility of slightly different heat treatments affecting the physical properties—but mostly to such conditions as the personal factor, different finish requirements, different amounts of metal to be removed by grinding, slight wheel and work speed variations, and other local factors.—*Grits and Grinds.*

Designs Heavy-Duty Type Boring Mill

THE boring mill shown in the accompanying illustration has just been developed by the Bullard Machine Tool Co., Bridgeport, Conn. The design embodies many features that the Bullard company has found practicable since it built its first boring mill 35 years ago.

The control of the machine by the operator is centralized. The clutch and brake for starting and stopping the machine is conveniently arranged for the operator no matter on which side of the machine he happens to be.

All bearings and gears having a fixed relation to the machine bed are lubricated by means of a continuous flow system. The oil is screened and filtered which eliminates, as far as possible, any scoring of shafts and journals. The oil is circulated by a pump directly connected to the main drive shaft.

All gears and shafts throughout the drive are heat-treated alloy steel. The gearing is encased but is readily accessible. The tool slides are of high tensile strength cast iron, cast in box form. The tool holders are of the inserted type. The slides have a vertical movement of 36 inches and are actuated by a rack and pinion. The tool slides may be swiveled to 45 degrees either side of the center.

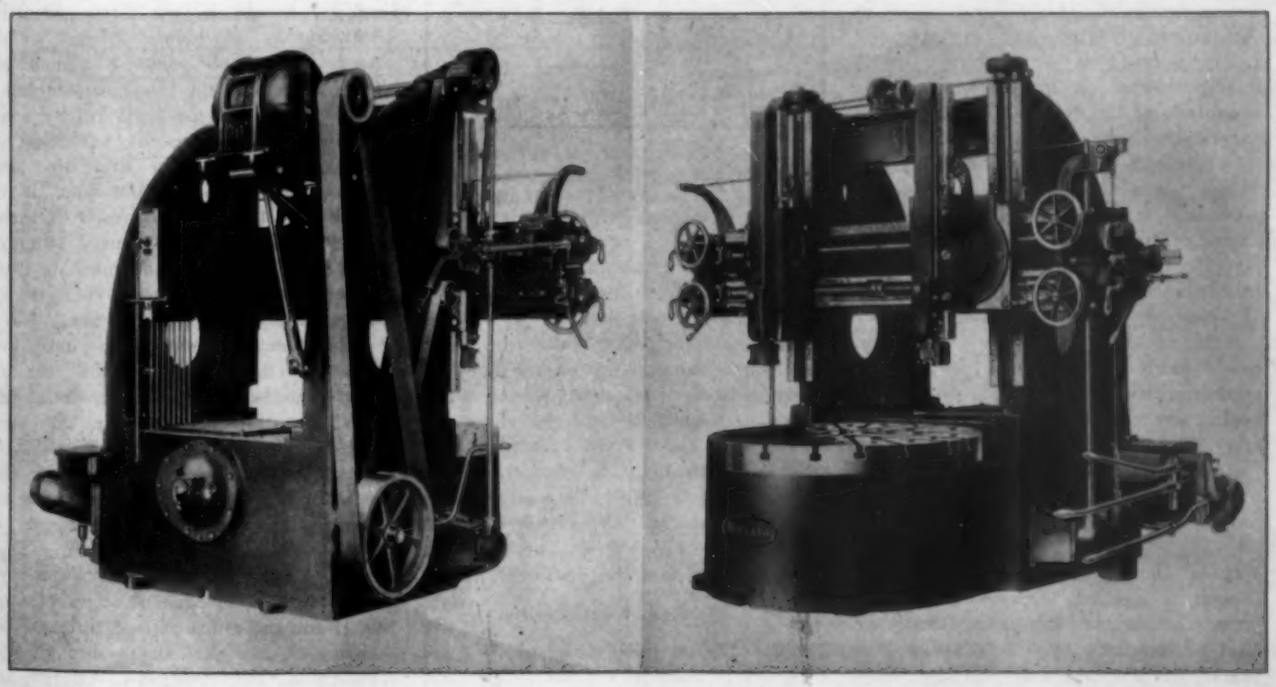
With the object of increasing the operator's ability to make fine settings, hand wheels have been installed in place of crank handles. This feature also eliminates any possibility of danger that might arise from swiftly revolving crank handles, due to rapid traverse motions.

The cross rail and the tool slides are equipped with graduated scales to facilitate accurate settings while finer readings, that is readings in thousandths of an inch, are determined through the medium of accurate micrometer dials.

The machine has a capacity of 63 inches in diameter while 52 inches can be swung under the tool holders. The table is 61 inches in diameter and is equipped with parallel T-slots which permit the use of four face-plate jaws.

There are 12 changes of table speeds ranging from 2.5 to 42.18 revolutions per minute. These speed changes are obtained by sliding gears and friction clutches which interlock with the clutch and brake levers.

The machine is designed for two drives; by a belt from an overhead countershaft or by means of an independent motor. For the motor drive a 15-horsepower constant speed motor is mounted on a bracket at the rear of the machine and connected to the driving pulley by a belt. The driving pulley is 24 inches in diameter with a 5½-inch face.



FRONT AND REAR VIEWS OF NEW BORING MILL. THE VIEW AT THE RIGHT SHOWS THE SPEED CONTROL LEVERS, POWER TRAVERSE FOR HEADS, HAND WHEELS FOR FINE ADJUSTMENT AND POWER ARRANGEMENT FOR RAISING AND LOWERING THE CROSSRAIL. THE VIEW AT THE LEFT SHOWS THE OILING SYSTEM, LEFT HAND CLUTCH AND BRAKE LEVER, POWER TRAVERSE FOR HEADS AND LEFT HAND FEED WORKS

Complex Stresses in Machine Parts

Determining Stresses Incident to Starting and Stopping With Special Consideration for the Factors of Inertia and Elasticity—The Influence and Nature of External Forces is Considered

BY F. HYMANS

THE cycle of operation of a machine can be divided into three more or less distinct periods, namely, the start, the run at constant speed, and the stop.

The design of machine parts follows at present one of two methods. The first assumes a state of equilibrium, which permits the application of the known processes of statics to determine the forces acting. The state of equilibrium, however, exists only when the machine runs at constant speed or is at rest. The second method assumes all of the machine parts to be rigid. The calculations are based on the external forces as they exist during stop or start, from which the forces acting on each part are determined by means of the dynamics of rigid bodies.

Present Methods Not Accurate

Neither of these methods leads to correct results. The first may be dismissed altogether, since no consideration is given to the quite different phenomena occurring at starting or stopping. In the second such a consideration is attempted, but the proof is based on wrong premises. If the assumptions in the second method are correct, the forces acting on the machine parts merely depend on inertia and on the magnitude of the external forces. From experience, however, it is known that the forces acting on a machine part do not depend alone on the two factors previously assumed, but also on the nature of the external forces. A feeble periodic force of the proper frequency, for instance, may cause the breakdown of a machine where a constant force of several hundred times its magnitude would easily be withstood. It is plain, therefore, that the methods mentioned neglect the consideration of some property through which in the resulting formulas the influence of the nature of the external forces vanishes. This property is the elasticity of the machine parts.

It is the object of the author to present a method whereby the forces acting on the machine parts during the start or stop may be determined with a degree of accuracy sufficient for technical purposes. While the method is explained in general terms for application to any machine, it is more specifically applied to the determination of the motion and rope tensions during the starting of the hydraulic machine shown diagrammatically in Fig. 1.

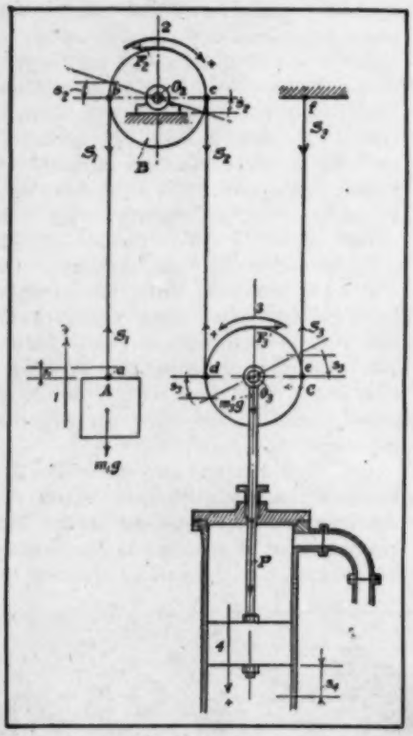


FIG. 1 — DIAGRAM OF HYDRAULIC MACHINE FOR DETERMINING THE STRESSES ON STARTING AND STOPPING

The machine consists of a vertical cylinder with a piston, adapted to lift the load A through the intermediary of a piston rod, a traveling sheave C, a stationary sheave B, and the ropes ab, cd and ef. The force P, acting on the piston and causing the motion of the machine, will be called the motive force, in distinction to all other external forces, such as the weight of load and machine parts, and the frictional forces.

Elasticity Considered

According to the foregoing, it is necessary to consider not only the inertia of the machine parts, but also their elasticity. Strictly speaking, all machine parts are elastic. Fortunately, however, there are always a few which have elasticity to such a predominating degree that other parts in comparison with them may be considered to be rigid. Thus any machine may be approximated by a system of parts, of which some have elasticity and others inertia only.

In the machine of Fig. 1, for example, it is at once evident that the ropes ab, cd and ef may be considered as the only elastic members. Their mass is small and may be neglected. The remainder of the machine parts, that is, the load A, sheaves B and C, the piston and piston rod, will be considered rigid.

The suggested method is based on the general energy equation of the machine, from which are derived all of the equations required in the further calculations. According to dynamics, this equation states that the gain in kinetic energy plus the gain in potential energy equals the work done by the external forces.

Deriving the Kinetic Energy Equation

To derive the energy equation of the machine certain displacements are assigned to the rigid machine parts, such as s_1, the linear displacement of the load A; s_2 and s_3, the circumferential displacements of points b and c of sheave B, and of points c and d of sheave C; and s_4, the linear displacement of the piston and the parts rigidly connected thereto. Since the velocities of the rigid parts are the first time derivatives of their displacements, it is quite simple to derive for each of them the expression of the kinetic energy. The kinetic energy of the machine then is the sum of the kinetic energies of its constituent parts.

The elastic machine parts—here the ropes ab, cd and ef—are the seat of the potential energy of the machine. By virtue of their elasticity they are capable of sustaining deformations, and so long as they are stressed below the elastic limit there is stored in them an amount of energy equal to the energy that produced the deformation. This energy is called the potential energy.

Considering the rope ab, it is evident that if the end b has moved through the distance s_3, and the end a through the distance s_1, the rope has suffered an elongation equal to $s_3 - s_1$. Knowing further the elongation which a tension of one pound will cause in the rope, it is merely necessary to apply the well-

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From a paper to be given at the meeting of the American Society of Mechanical Engineers on June 4. The author, Frederick Hymans is engineer for the Otis Elevator Co., New York.

known laws of statics to determine the energy necessary to produce the deformation $s_2 - s_1$.

This process is also applied to ropes *cd* and *ef*, and the potential energy of the machine will be the sum of the potential energies of its constituent elastic parts. The derivation of the work done by the external forces needs hardly any elucidation.

From the foregoing it will be evident that, after having determined which of the parts shall be considered elastic and which rigid, the derivation of the general energy equation of the machine will not present any considerable difficulties. It will also be quite clear that the machine parts to be considered rigid are those wherein either the stress or the deformation, or both, are so small that the amount of potential energy stored in them is negligible. Further operation with the general energy equation is facilitated by the resolution of the absolute motion into two components, which may be termed rigid and relative motions. This is based on the following considerations.

The tension in rope *ab*, Fig. 1, changes from instant to instant during the start of the machine. If the tension decreases, the rope contracts, causing points *a* and *b* to approach each other. Vice versa, if the tension increases they recede from each other. These varying elongations, however, are merely varying increments in the free length of the rope *ab*. It follows at once that the motion of points *a* and *b*, that is, the motion of the load *A* and of point *b* of sheave *B*, consists of two components. One of these components is common to both, and is a motion wherein the linear distance between the points *a* and *b* is preserved and remains equal to the free length of the rope. The second component is superposed on the former, and corresponds to the varying elongations due to the elasticity of the rope.

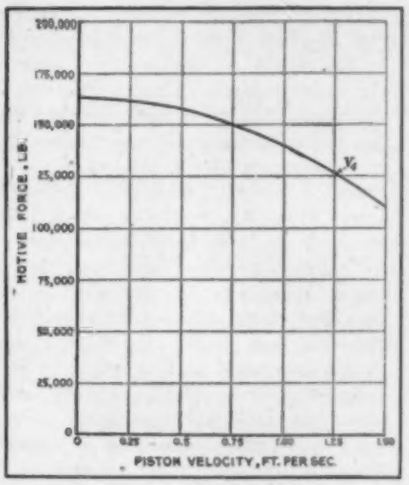


FIG. 2—MOTOR CHARACTERISTICS CURVE

Machine Part Motions

The component first named is the motion which would take place if the rope *ab* were non-extensible. In general, the motion of each machine part is the same as the motion which it would have if all of the machine parts were rigid, superposed by a motion relative thereto. It is this relative motion which is neglected if the calculations are based on the assumption of a state of equilibrium, or if all of the machine parts are assumed to be rigid.

The energy equations for the rigid and relative motions are easily derived from the general energy equation, and may be integrated separately. To prepare for the integration of the energy equation of the relative motion, the so-called theory of normal co-ordinates is used. By means of this theory the displacements s_1, s_2, etc., may be expressed as the sum of a number of normal displacements, each of these being the product of a normal constant into a normal co-ordinate. Of the normal constants and co-ordinates only a few general types need be determined.

All of the external forces active on the machine are constant with the exception of the motive force *P*. Strictly speaking, the frictional forces also are variable, and are really functions of the motion of the machine. On the other hand, the coefficient of friction depends on a number of factors which are only imperfectly known. In addition, the frictional forces are, as a rule, small as compared with the other forces acting on the machine parts. There is therefore no advantage in introducing needless refinement, and it is sufficient to consider the frictional forces as constant.

If it were possible to express the motive force in an explicit function of the time, the previous integrations could be executed easily, either mathematically or graphically. For machines yet to be built this is impossible. However, there is available for the further calculations

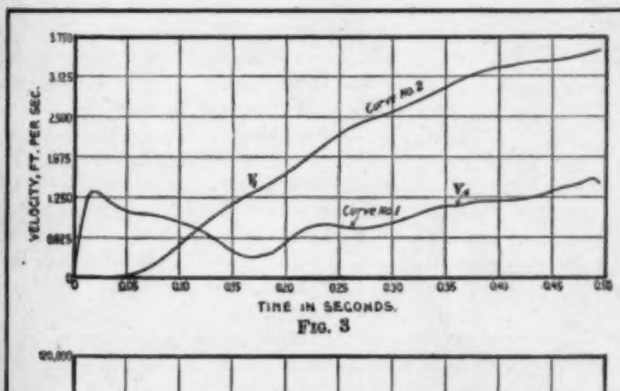


FIG. 3

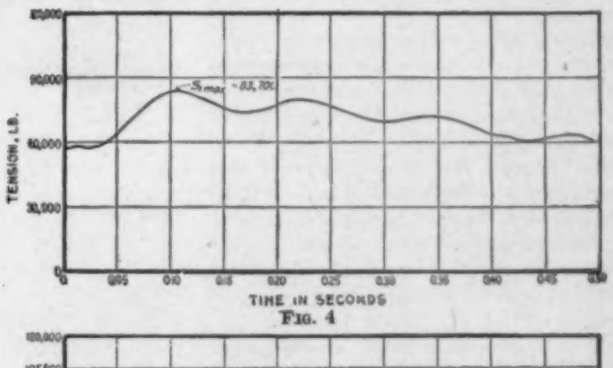


FIG. 4

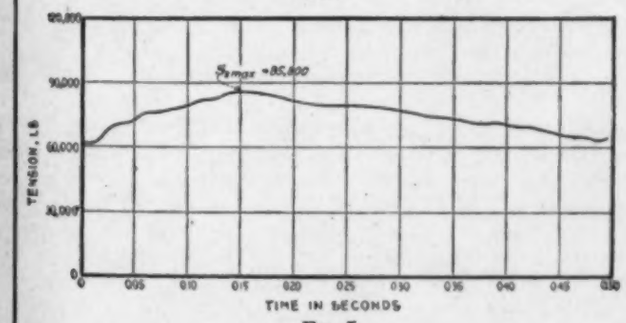


FIG. 5

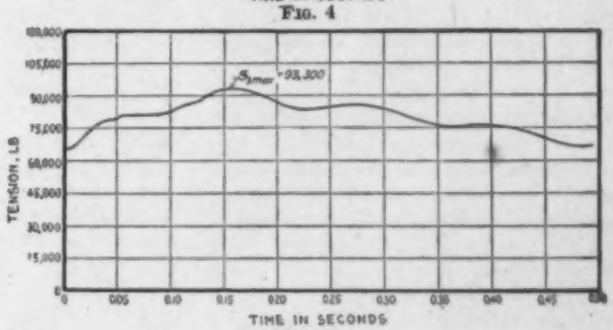


FIG. 6

FIG .3—ABSOLUTE VELOCITIES OF PISTON (CURVE NO. 1) AND OF LOAD (CURVE NO. 2)

FIG. 4—TENSION S_1 IN ROPE *ab* OF FIG. 1

FIG. 5—TENSION S_2 IN ROPE *cd* OF FIG. 1

FIG. 6—TENSION S_3 IN ROPE *ef* OF FIG. 1

what is known under the name of the motor characteristics.

The motor in general will be that machine part which is the seat of the motive force, irrespective of the latter being due to electric, hydraulic, steam or gas pressure. The force or torque exerted by these motors varies with the motor speed, although the manner in which these variations take place is frequently too complex to be expressed adequately in a mathematical formula. Fortunately, the latter is not necessary for the purpose in hand, since it is always possible from tests with the motor alone to derive a graph showing the variation of the motive force with the motor speed.

In the present case, the motor characteristics will be the performance of the piston alone when operating in the cylinder under the given conditions as to piping and water pressure. They are represented by Fig. 2, which shows the net force P which the piston rod will exert at various piston speeds.

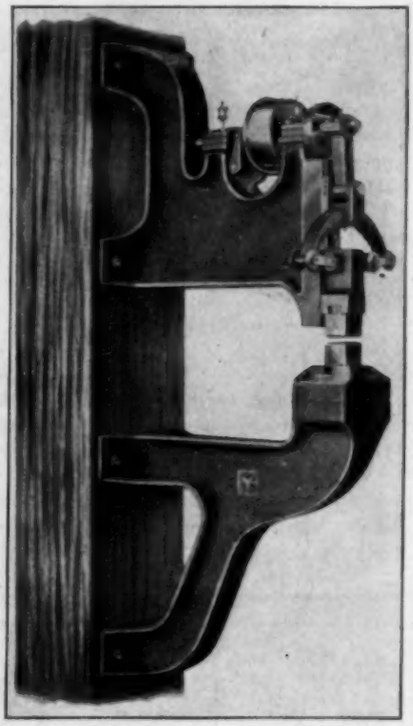
Calculating Factors in Starting

The calculations proceed by dividing the starting period into time intervals of so small duration that the motive force during any such interval may be considered constant, without that an appreciable error is committed.

For the first time interval, beginning with zero piston speed, it is found from Fig. 2 that the motive force P amounts to 163,000 pounds. For the entire duration of this interval, taken at 0.005 seconds, the motive force is assumed to remain constant at 163,000 pounds. Under these conditions the various displacements, rope tensions and piston speeds are determined. At the end of the first time interval the piston speed amounts to 0.578 feet per second, when from Fig. 2 it is at once found that a motive force of 155,200 pounds corresponds to that speed. For the second time interval the motive force is then assumed to be constant at 155,200 pounds and the calculations are repeated.

The results of the calculations are shown in the various graphs, of which four are here given in Figs. 3, 4, 5 and 6.

Fig. 3 is particularly instructive in regard to the phenomena occurring at the start. Curve No. 1 represents the velocity of the piston, and curve No. 2 the velocity of the load A. Owing to the small inertia of the piston masses, it is to be expected that at the application of the motive force the equilibrium of the piston will be violently disturbed, while the effect on the heavy load will be less severe. This is clearly reflected in Fig. 3, where the piston speed rises from zero to 1.35 feet per second within about 0.02 seconds, whereas the velocity of the load after a lapse of even 0.05 seconds amounts to only 0.03 feet per second. That such conditions do not lead to heavy stresses in the ropes is due to the nature of the motive force. Large variations in the piston velocity cannot persist, since the motor characteristics are such that an increase in the motor speed corresponds at once to a drop in the motive force (Fig. 2), and vice versa. The motive force, therefore, has the tendency to counteract large variations in the piston speed, as is witnessed by the smoother course of curve No. 1, Fig. 3, after the first violent rise. If the ropes of the machine of Fig. 1 were non-extensible, or under conditions active when the machine is running at constant speed, there would be a 2:1 ratio between the motion of the load and that of the piston. Owing to the elasticity of the ropes, however, there is no vestige of any such ratio during the start, as will be seen from Fig. 3. After a lapse of 0.05 seconds, for example, the ratio between velocities of load and of piston is as much as 1:35; after 0.117 seconds it is 1:1; after 0.3 seconds it is approximately 3:1.



POWER HAMMER FOR FORMING SHEET METAL

The rope tensions as they vary with time are shown in Figs. 4, 5 and 6. In the state of equilibrium $S_1 = 58{,}000$ pounds, $S_2 = 61{,}000$ pounds, and $S_3 = 64{,}300$ pounds. During the start, however, $S_{1max.} = 83{,}700$ pounds, $S_{2max.} = 85{,}800$ pounds, $S_{3max.} = 93{,}300$ pounds, exceeding the former by 44.2 per cent, 40.5 per cent, and 45 per cent, respectively. It will be seen that in the present case the forces S_1, S_2 and S_3 are not greatly in excess of the values which they have as soon as the machine runs at constant speed. This is primarily due to the nature of the motive force, as already explained.

From the foregoing it follows that the stresses in a machine at starting or stopping depend on a number of factors. The effect of a locomotive, for example, placed at the head of a string of cars, will be quite different than when placed in the middle. The elasticity of the individual machine parts and the distribution of the elasticity throughout the system have a prime effect. If, for instance, the equilibrium of the motor is liable to be violently disturbed at the start, the stresses in the machine will be less if the motor is coupled to the remainder of the machine by elastic members. The nature of the motive force deserves great attention. In the hydraulic machine of Fig. 1 the drop in the motive force is approximately proportional to the square of the piston speed. Had the motor characteristics been such that the drop in the motive force was only proportional with the piston speed, far larger stresses would have resulted.

Balanced Forming Hammer

A power hammer for forming and planishing various shapes of sheet metal such as automobile bodies, cowls, hoods, carriage bodies and other curved sheet products, has been placed on the market by the Yoder Co., Cleveland. Several sizes are built to accommodate diversified classes of work. The smallest size, which weighs 900 pounds, is shown in the accompanying illustration. The main shaft bearings are of the cap type. They are separate castings apart from the main frame and are bronze bushed. The bearing block may be removed from the frame, bushed and placed in the original position without removing the hammer from its position. All bearings are equipped with sight-feed oil cups.

The force of the stroke of the hammer is controlled at the head of the drive shaft. The connecting rod is adjustably secured to the drive shaft head by a pin bolt, one end of which is engaged in a dovetailed slot in the head. The lower end of the connecting rod is attached to the spring block which is provided with a large dovetail that slides vertically in a dovetail groove in the face of the main frame. This groove is provided with an adjustable bronze jib. The hammer block and spring move in a vertical direction only and it is claimed that all of the wabble in the spring and the consequent vibration is eliminated. The upper die block is made of extra heavy cast steel and is reinforced at the dovetail groove.

Will Take French Industrial Census

Bureau of Statistics Will Canvass All French Manufacturing Plants—Machine Tools in Good Condition will be Classified so as to Prepare for the Industrial Revival After the War

BY FRANCIS MILTOUN
Paris Correspondent of THE IRON TRADE REVIEW

9 Rue Falguiere, Paris,
March 30, 1918.

IN MOST of the non-professional walks of life, France is not a country of mechanical aid to existence. Even the automobile is in the same category, a fact which is well recognized when it is recalled that the registration of automobiles in France before the war was not much more than 150,000. The number of typewriters was small, so were the numbers of motor boats, machine tools and agricultural machinery. This is not saying that such things did not exist, but with the farming community alone, an old bible-time wheel and bucket irrigation appliance often served the purpose of an electrically or gasoline-driven pump and the scythe and sickle, the modern reaper. This was accounted for largely from the fact that the exploitations were not of the proportions where it was thought that anything but hand and rudimentary forms of labor could be advantageously used. These views were wrong perhaps, but the ideas of tradition did the rest.

In industrial enterprises much the same state of affairs existed. The workman, who was at least an artisan, filed away by hand, worked penibly at hand or low power-driven machinery and seldom made any effort to augment his business to proportions which would warrant his changing his equipment. It is no injustice to French industrial enterprises to consider the subject from this viewpoint, in that France was essentially a country of small industries.

Scope of Census

In view of a satisfactory solution of the French industrial problem after the war, the chamber of deputies is considering measures to be taken towards recensusing all the resources and facilities and equipment of the various classes of French industry. A law which is expected to be passed within a few weeks, provides specifically for a census of industrial machinery.

The chief phase of the problem alludes to the possible utilization of the large supply of metal besides industries and factories which are at present engaged in making government munitions. The development of these vast new factories has gone on all over France. Small factories with a few hundred employes have seen themselves grow over night into companies with many thousand employes, and from half an acre in extent to five acres. Within their walls have been massed batteries of machine tools such as never were dreamed of in times of peace. The question is, what can they all be used for after the war? It is not so difficult to answer this question as might first appear. The problem has to be worked out with that true parentalism which is the foundation of the French government. It is the government which will bear the responsibility. It will point out the way in which the vast resources may best be used for future economic prosperity of the nation.

In the industrial domain we shall see the same results produced in France that we have seen produced in other ally countries. Large quantities of material were required for general consumption which formerly came from Germany and included wire nails, magnetos, files, machine tools of a portable nature, barn door hinges, and steam heating installations. It seems appalling that so much came from Germany—and so little of a like nature was produced in France. Hinges to a great extent were hammered out by hand by the local blacksmith and steam and gas fittings were usually a local product so far as their assembling was concerned where these things came into the category of home production. The French people lacked most if not all the first principles of standardization.

It is proposed to begin the classification of these industrial establishments by dividing them into two classes, one working for government interests and the other for the domestic trade. In the first classification two distinct divisions will be established, one comprising the unadaptible and the other including those elements which by transformation can be adapted to other needs than for making armament, ammunition, explosives or equipment. A close study will be made of conditions. There will practically be a mobilization of all factories and organizations which may render an immediate service and ease the pressing economic needs of the country.

Some difficulty may be anticipated by the employment of the processes of bureaucracy, but the expert opinion will prevail in the long run under the able guidance of the minister of labor whose forces are largely recruited from practical men not mere theorists. This is to be the specialty of this branch of the government, aided as far as possible by other departments. The actual recensusing will be in the hands of the general statistics bureau of the government, but the classification will be the work of specialists.

Such a document once it is prepared and standardized will be an aid towards the reconstruction of economic France. It will indicate the number of tools in good order and number of men required to keep them at maximum efficiency. This will help greatly in adjusting the labor disorders which are bound to arise when the 5,000,000 soldiers are demobilized. There must also be taken into consideration the disposition of the 1,500,000 women workers who have found new employment in most industries, notably in that of the metal trades, during the war.

Lack of Confusion

Factories working today on machine guns and cannon, may thus be transformed with the least possible delay into establishments capable of building tools and machines of production in the arts of peace. These machines must be of the automatic or semiautomatic type, because of a labor shortage which is bound to come after the war.

The foregoing is the new program for France. The fact that it was not put into effect before explains why Germany was able to import into France such materials as French nails, electric lamp bulbs, electric fittings and rails. The French manufacturer was satisfied with the amount of orders for these materials which came from Germany but did not over-exert himself to get the trade and keep it at home. The French manufacturer, like the French financier, was often far more interested in going out into foreign markets than he was in catering to the home market. Money was loaned to Turkey on the security of the Ottoman loan and an order for millions for building and equipping Turkish lighthouses was obtained in return. At the same time France bought magnetos in Stuttgart and glass eyes for the famous French dolls in Meissen.

The figures are not available as to how much of this business can be kept in France in the future, but at all events France will not depend on Germany for

mechanical toys. There are 4000 women working in the Saint Chamond steel works today screwing fuses into shrapnel shells. When the war is over and these women are no longer needed in the steel industry they can build mechanical toys for children, carburetors for automobiles, tend automatic screw machines or what not.

A curious and potent side light is that which appeared in a Paris paper as these lines are being compiled. It was a protest on the part of 185,000 metal workers in the Paris district alone protesting against the men of their craft allying themselves now, or ever, with any international trades union. "France for the French" is the slogan in all trades and in no branch of the industry is the note sounded louder than in the iron and steel business.

Measuring Air-Flow From Rotary Blowers

TESTS to determine the volume of gas delivered by centrifugal exhausters are more easily and more frequently made than the corresponding tests of rotary exhausters, because the discharge of the latter is pulsating. Nozzles or orifices cannot be used to measure pulsating flow unless the pulsations are eliminated. These tests are seldom performed on rotary exhausters chiefly because every rotary exhauster is a meter of the displacement type, so that the speed of the exhauster is a measure of the quantity of gas delivered. A definite quantity of gas is imprisoned during each cycle and delivered positively, except for the leakage or slip. The latter is constant regardless of speed, depending only upon the inlet and outlet pressures, and upon the density of the gas being exhausted.

In each rotary exhauster there is a speed, commonly referred to as the slip, at which the leakage accounts for all of the gas handled by the exhauster. Above this speed the exhauster delivers its full displacement to the discharge system. The probable delivery, therefore, is found by multiplying the difference between the slip speed and the actual speed by the displacement of the exhauster per revolution. Evidently, the volumetric efficiency increases with the speed. When the speed of the exhauster is 10 times the slip speed, the volumetric efficiency is 90 per cent. Some operators of rotary blowers and exhausters believe that other factors enter into the rate of delivery. The belief is rather general that pressure drop due to friction in the intake pipe reduces the delivery and counteracts the increase in efficiency due to the higher ratio of actual speed to slip speed.

These theories were investigated by Professor W. Trinks of the Carnegie Institute of Technology who made tests on a rotary blower which was built by the P. H. & F. M. Roots Co., Connersville, Ind. The arrangement of the testing apparatus is clearly shown in Fig. 1. The air enters the right-hand tank through standard nozzles. This tank is closed at the top by a thin rubber diaphragm, the mass of which is so small that it vibrates with the pulsations of the air in the intake pipe and maintains practically a steady flow of air through the nozzles. When the blower is in operation the oil in the draft gage near the blower vibrates with the pulsations in the air column, while the oil in the draft gage at the measuring tank is motionless. The water seal at the extreme right in Fig. 1 saves the rather expensive rubber diaphragm in case the blower is started with all the nozzles closed. The intermediate tank between the measuring tank and the blower is not absolutely necessary in this test, because the vacuum produced is not greater than the rubber diaphragm will allow.

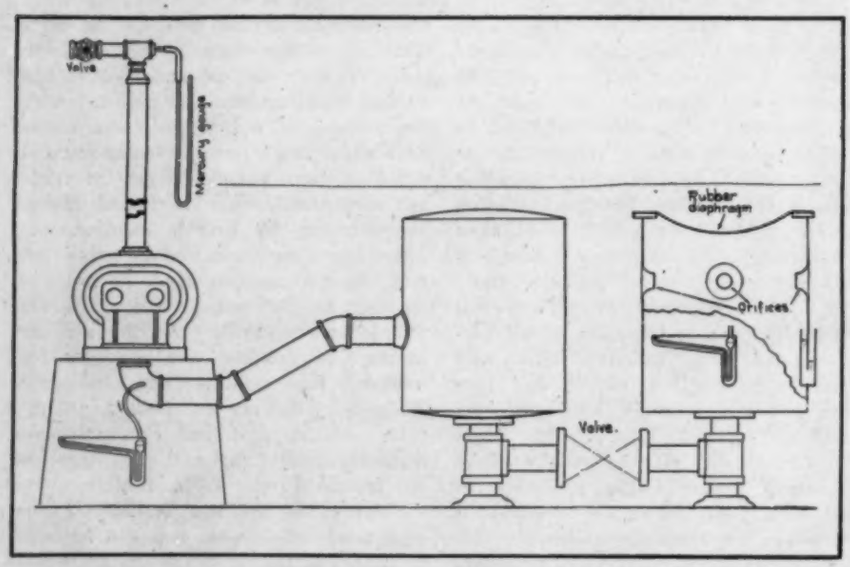


FIG. 1—ARRANGEMENT OF APPARATUS FOR TESTING ROTARY BLOWERS

The relation between the quantity of air delivered and the speed of the blower is shown in Fig. 2. The test of the blower produced the left-hand curve. The results were so surprising the tests were repeated with a larger slip speed. In order to obtain the latter the head-plates were removed from the blower and more red lead was put into the joint. The right-hand curve was obtained from this test. It will be seen that the character of both curves is exactly the same. The length and shape of the inlet pipe were varied and the location of the pressure gage on the outlet was changed; but these changes had no appreciable influence on the shape of the characteristic curves. In these tests the discharge pressure was five pounds per square inch. At lower pressures the slip speed is much less.

The actual delivery falls below the probable delivery at lower speeds and rises above it at higher speeds. Vibrations of the air column undoubtedly explain this peculiarity. At low speeds the whole column is accelerated and retarded, but as the speed increases the inertia of the column causes vibrations of a sound-wave character to appear. At certain speeds, the phase of these vibrations corresponds with the opening of the blower to the suction and an extra quantity of air is shoved into the blower, thus increasing the delivery. This case is parallel to that of blowing engines with air-intake pipes and automatic-inlet valves where the delivery is likewise increased by the inertia of the air in the intake pipe.

Vibrations have a phase-lag against the impressed vibration of the blower. This may explain why attempts to furnish an engine torque coinciding with the static torque of the blower have not been successful. Vibrations occur not only in the intake but also in the discharge pipe. It has been thought that perhaps at high speeds these vibrations might become destructive. It is true that vibrations increase with the speed but only up to the point where they become sound-waves. Above this speed the pitch of the sound, i. e.,

frequency of vibration, increases; but the amplitude, i. e., loudness, remains constant. The maximum vibration depends upon the ratio of outlet-pipe size to fluctuation of displacement. The smaller the outlet pipe for a given blower, the worse the vibration becomes. With the average size of outlet pipe the vibration to either side from mean does not exceed 10 per cent of the absolute average outlet pressure. In unusually long pipes, however, resonance might increase this somewhat.

Boring Machine of Heavy Design

The horizontal-spindle machine shown in the accompanying illustration has been developed by the Defiance Machine Works, Defiance, O., for boring, milling, drilling and tapping. All moving parts of the machine are enclosed and oil-tight. An oil pump is used to pump oil through the head, speed box and feed box. All journals have heavy ball or thrust bearings. Ball thrust bearings are used in the spindle and on all actuating screws. All other bearings are bronze-bushed. Eight control levers are used to make all necessary changes and these are placed within easy reach of the operator.

The bed of the machine is of box construction and is heavily cross-ribbed. The machine is self-contained and rests on the floor at three points. The column is of box section, flaring out at the bottom to give a large bearing surface where it is bolted to the bed.

The spindle is hammered high-carbon steel. The spindle sleeve is a high-carbon steel forging with a conical journal at the front revolving in a solid bronze box. It has an adjustable taper sleeve at the rear. This arrangement permits large milling cutters to be bolted directly to the large flange on the end of the spindle sleeve.

The spindle head has an ample bearing and a gib on the front side is set up for a free sliding fit. A binder screw back of the gib is provided for locking the head to the column. The spindle head and tail block are raised and lowered together. They are connected by a shaft and bevel gearing.

The platen has a large working surface with T-slots of sufficient depth to insure strength. The gibbing to the saddle is of the square lock form. A binder screw is used to clamp the platen in place. The movement of the platen is regulated by a throw-out device.

The saddle is extended out beyond the bed to give support to the platen at its extreme front and rear positions. It is gibbed to the bed and a tapered gib is provided for taking up wear.

The feed is applied to the spindle in or out of the spindle head and tail block, up or down to the saddle along the bed and to the platen across the saddle. Two levers operate the shift with two sets of cone gears, four in one and three in the other. This gives 12 changes of feed per revolution of spindle. Fast travel to all parts having feed is obtained by a lever which gives travel in either forward or reverse operation.

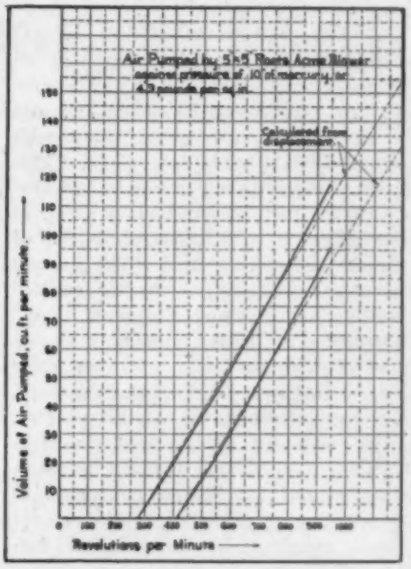

Air Pumped by 5-in. Roots Acme Blower
Calculated from displacement
Volume of Air Pumped, cu. ft. per minute
Revolutions per Minute

FIG. 2—RELATION BETWEEN QUANTITY OF AIR DELIVERED AND SPEED OF BLOWER

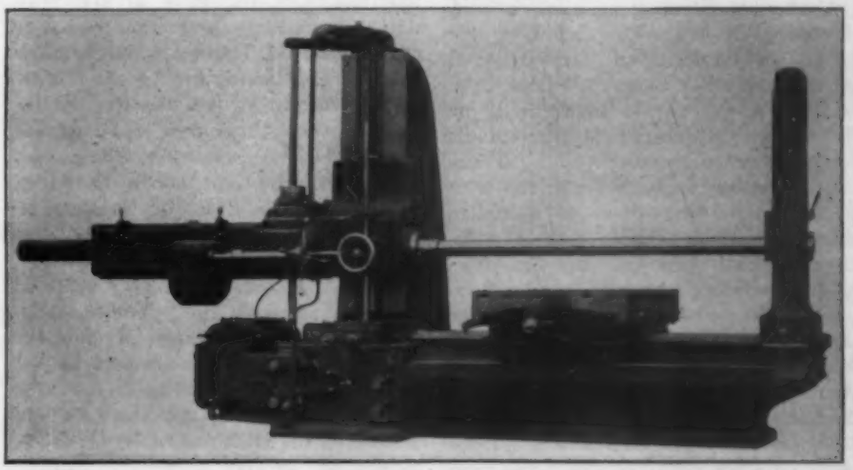
Portable Tiering Machine

A machine for piling rolls of paper, cases, bales, crated machinery, etc., in freight cars has been placed on the market by the Revolvator Co., Jersey City, N. J. The machine can also be used for piling material in the storeroom or for loading trucks. The machine is mounted on wheels and is fitted with an extension arm which operates vertically. It is claimed that bulky material can be piled to the roof in box cars.

Market Opportunities in the Philippine Islands

As a market for modern machinery of nearly every kind, according to a statement by the National Bank of Commerce, New York, the Philippine islands have been little more than touched. Primitive machinery and methods have been the rule. Only a beginning has been made in the use of modern machinery in the various lines of manufacture. The opportunities for providing manufacturing plants for the preparation of raw products for export are great. The proposed erection of a system of sugar centrals in the various producing regions of the Philippines offers a field for a vast amount of modern sugar machinery. The transformation of the copra business into an oil business now is rapidly taking place. An immense saving in freight is being made by manufacturing the oil on the ground. An extensive supply of excellent paper material is found in the Philippines that could be made into paper in the islands to advantage, and the government is doing its best to arouse interest in this direction. Such machinery as is now being used is chiefly American, British or German, with the former increasingly predominant. That which has been in use the longest is mainly British; that installed more recently, American.

Philippine reports of imports of iron and steel include not only iron and steel, but all finished products, including a great deal of machinery. Imports declined since 1913, until during 1916 they totaled but $3,763,239 as against $8,613,904 three years earlier; but in



HORIZONTAL BORING, DRILLING, MILLING AND TAPPING MACHINE

1917 they increased to $5,927,563. The United States entirely dominates the market, our imports constituting about 81 per cent, in 1916 and 84 per cent in 1915. Japans' exports to the islands have leaped from one-tenth of 1 per cent in 1913 to 6 per cent in 1916. Great Britains' exports fell from 13 per cent of the total iron and steel and manufactures imported into the islands in 1913, to 8 per cent in 1916, while Germany's fell from 8 per cent in 1913 to less than one-half of 1 per cent in 1916.

High Level Truck

The efficiency of machine operators is reduced and time lost if the workmen find it necessary to continually stoop or bend in transferring material from the shop trucks to the machines or vice versa. In order to eliminate this source of loss, the truck shown in the accompanying illustration has been designed by the Orenstein-Arthur Koppel Co., Koppel, Pa. It is so constructed that the whole load is balanced on the center axle which is of large diameter. Wide tire, roller bearing wheels are provided. The rated capacity of the truck is 1500 pounds. It is stated the truck can be moved easily when fully loaded.

Book Review

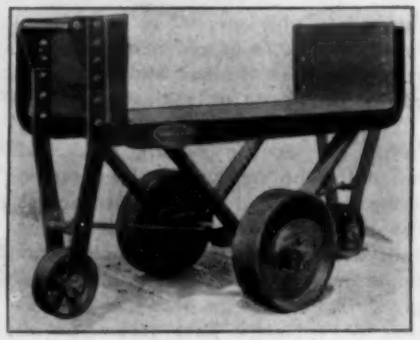
Powdered Coal as Fuel, by C. F. Herington; cloth; 211 pages, 6 x 9 inches; published by D. Van Nostrand Co. and furnished by THE IRON TRADE REVIEW for $3 net.

Fuel is a necessary adjunct to production and production, in quantity and variety, is necessary to win the war. Winning the war at present, is the most important thing on earth. Therefore any volume which gives reliable and helpful data on the use of fuel in production is timely.

The use of powdered coal is still comparatively new. The author of this book, in speaking of powdered-coal plants, says that some of them have been in service for as much as 10 or 15 years. Although this period is negligible when compared with the history of other fuels, nevertheless it is a sufficiently long time in which to demonstrate the effectiveness of this form of coal. To bear out his statement concerning the efficiency and inexpensiveness of powdered fuel, the author has compiled tables showing the initial cost of installing plants burning fuel oil, water gas and powdered coal. In the latter case both the screw conveyor and the air distributing systems are considered. First costs having been established, another set of tables follows showing various operating costs.

The first part of the book is devoted to the general subjects pertaining to the use of pulverized fuel. Coals suitable for powdering are discussed, and the results of experiments made with various kinds of coal are given. This is followed by a chapter on the preparation of the fuel, which includes excellent descriptions of the different kinds of crushers and dryers used. The general discussion ends with a chapter entitled "Feeding and Burning Powdered Coal." Descriptions of furnaces suitable to this form of fuel, particular attention being paid to burners and feeding systems, form the subject matter of this chapter.

The remainder of the book describes the uses of pulverized fuel in particular industries or branches of industries, as for instance, powdered coal in the cement industry, in metallurgical furnaces, under boilers, and for locomotives. The final chapter discusses the danger of explosions in powdered coal plants and gives methods for preventing them. The book contains numerous illustrations.



A HIGH LEVEL TRUCK DESIGNED FOR MACHINE SHOP USE

Study Sand Problems

The members of the New England Foundrymen's association were treated to a highly interesting and instructive talk and discussion at the May dinner, held recently at the Exchange club, Boston. The principal speaker was R. F. Harrington, of the Hunt-Spiller Mfg. Co., of Boston, whose subject was "Foundry Molding and Facing Sand Problems". There also were addresses by W. S. Saunders, of Saunders & Franklin, Providence, R. I., and H. B. Hanley, of the New London Ship & Engine Co., Groton, Conn. All three speakers spoke from varying angles on the selection, separation and reclamation of foundry sands. Those who took part in the discussion which followed included F. W. Stickles, of the Capitol Iron Foundry, of Hartford, Conn.; T. D. Scott, of Brown & Sharpe, Providence, R. I., and Messrs. Kent and Thoel, of the General Fire Extinguisher Co., Providence, R. I.

Ferro Imports Heavier

Ferromanganese imports in March ran somewhat heavier than the average for the preceding nine months and were 3555 tons. This compares with 5324 tons for the corresponding month in 1917. The nine months' total is shown to be about one-third of that for a like period in the preceding year. A decided slump in manganese ore imports is represented by the March record of 19,300 tons. This compares with 56,394 tons in March, 1917.

The imports for March and for the nine months of the fiscal year compared with the previous year of ferroalloys and metals is as follows:

	March, 1918	March, 1917	Nine months ending March, 1918	Nine months ending March, 1917
Ferromanganese, tons..	3,555	5,324	20,807	61,059
Ferrosilicon, tons.	337	977	5,173	5,624
Manganese ore, tons	19,300	56,394	431,718	485,018
Tungsten bearing ore, tons	317	269	3,703	2,952

Shipping Field Pieces

The Wisconsin Gun Co., Milwaukee, organized last fall by the heads of five leading metalworking concerns of Milwaukee at the request of the government to manufacture field pieces, has made its first shipment and production now is going on at a rate making possible regular deliveries. The company erected a shop at an estimated cost of $250,000 and equipped it for the production of the United States 1916 model field gun, a 3-inch piece similar to the French "75", and so constructed as to fire both shells and shrapnel. A production of three per day has been reached. It is said that the company's contract calls for 1000 guns. The government furnishes the rough forgings and the finished gun is shipped to the Rock Island arsenal for mounting on the gun carriages.

The Carnegie Steel Co., Pittsburgh, has issued a new edition of its booklet on steel derricks and drilling rigs for oil, gas, salt and other wells. These rigs also are used for mineral exploration. The Carnegie Steel Co. has manufactured steel oil derricks since 1903 and steel drilling rigs since 1907. The design and construction of various types of drilling rigs and derricks are fully covered in the booklet, which is profusely illustrated with reproductions of detailed drawings. Auxiliary apparatus for well drilling also is fully described and illustrated.

Making Tool Steel in War Times

Task of Selecting Raw Materials Constantly Becoming More Difficult—Ferroalloys Smelted in Electric Furnaces—How Uniformity is Obtained—Metallurgists Work Daily Growing More Important

BY FRANK B. LOUNSBERRY

IN tool steel manufacture the selection of the raw materials is very important and only the best are suitable. This is especially true of the crucible process in which little or no refining is possible. Therefore, raw materials for crucible steel are purchased on analysis, with special attention to their sulphur and phosphorus content. It is, of course, true that wider latitude in the selection of materials can be used in the electric furnace, but this should not be imposed upon. Too many have made the mistake of expecting to get a first quality product from their electric furnaces by using junk to begin with. You cannot make good bread out of bad flour, no matter what Hoover says, and making tool steel is very much a cooking proposition.

With the raw materials properly selected, the first step in the process is the melting operation. In the plant, with which the writer is connected, however, the first operation must be considered as occurring in the electric refining department, as here one of the most important raw materials, ferrotungsten, is produced. This is brought about by the reduction of tungsten bearing ores under the influence of the electric arc in small electric furnaces. The chief ores are scheelite, wolframite, hubernite and feberite coming from Boulder, Colo., Johannesburg, Cal.; Arizona, Bolivia, Peru, France and Spain. They vary from 60 to 75 per cent WO_3, or tungstic oxide. Certain of these ores as received are high in sulphur, sometimes containing as much as 2 per cent and must be roasted as the percentage of sulphur in the finished ferro must be very low. The ores, if not already fine, are ground, mixed with suitable proportions of soda ash, lime and charcoal, and charged into the furnaces where the WO_3 is reduced to ferrotungsten. This ferrotungsten usually contains around 75 to 80 per cent metallic tungsten. Two and one-half to three and one-half hours are usually required to melt the charge thoroughly and it is then killed, which requires about 30 minutes.

As the pots are pulled from the furnace they are delivered to the melter who in turn empties them. It is at this point that different manufacturers of crucible steel differ. Some pour the contents of each pot individually into molds whether casting small or large ingots, while others first teem all the individual crucibles into a ladle and then proceed to cast their ingots from this ladle. In my estimation there is little comparison between the two methods as far as obtainiing uniformity of product is concerned. In the first method you are apt to have as many different annalyses as you have pots where single plot ingots are cast, and where large ingots are cast the casting must necessarily be more or less intermittant. Outside of a few improvements in construction and handling the entire process of crucible melting has changed but little since its first introduction by Huntsman in 1740.

In the electric melting process instead of weighing out the raw materials in 90 or 100-pound lots the entire furnace capacity is weighed up as a charge. This charge, be what it may, ingot crop ends, punchings, boiler plate, flashings, tubing, etc. is charged by hand into the furnace. Upon the completion of this operation a certain amount of lime and slag-making material is also charged into the furnace. The slag is the chemically active portion of the bath and upon it depends the amount of refining that is accomplished. The usual consumption of electricity per ton of liquid steel is about 600 to 650 kilowatt when starting from a cold charge. The melting down operation, that is bringing th entire charge to a molten condition, requires from 1½ to 2½ hours. At this point a test or preliminary sample of the bath is taken and sent to the laboratory for analysis. While awaiting the report from the laboratory which takes from 20 minutes to an hour, depending on the type of steel, it is usually necessary to pull a slag. During the melting down process and before the temperature of the bath becomes too high certain impurities in the charge, especially phosphorus, are taken up by the slag and held as long as the slag is basic. As the temperature increases and the old slag remains in contact with the bath it has a tendency to become acid or at least less basic, giving up some of its phosphorous back to the steel. As this is not desirable, it is advisable to remove this slag and put on a new one. A strongly reducing atmosphere is maintained throughout the remainder of the heat, to eliminate sulphur.

After annealing followed by grinding to remove pipes, seams, etc., the ingots are ready for cogging. Before being hammered they are charged into the hammer reheating furnaces. The ingots are slowly and carefully brought up to forging temperature. With each hammer is the hammer crew, consisting of hammerman and helper, heater, hammerdriver and levermen. The hammerman is in charge of the work; frequently he works on a contract tonnage and hires his own men. He must know exactly how high to heat each different grade of steel, within what limits of temperature it will forge without disaster and just how much reduction it will stand. The size of the ingots must be properly proportioned to the different-sized hammers or correct results cannot be obtained. Overheating and bursting are two of the greatest difficulties encountered in this department.

Due to the many different grades and shapes of steel, and the thousands of different sizes an accurate yet simple system of keeping track of the material from the ingot to the finished bar must be worked out. Not infrequently a billet or two of one kind of steel gets into a lot of billets of the same size of another steel and probably will not be caught until the final inspection and sometimes not then if the only difference is in the temper, both being the same grade. Consequently, the entire process requires constant vigilance and attention in order to produce quality material. By far the greatest part of the task of maintaining the quality of the product falls to the metallurgist as most everyone else is primarily interested in production and is very apt to overlook many vital matters.

The author, Frank B. Lounsberry, is metallurgist, Atlas Crucible Steel Co., Dunkirk, N. Y. This paper was pre ented at a recent meeting of the Pittsburgh Foundrymen's association.

Priority to Restrict Nonessentials

Industries Board Will Make no Formal Classification Between War and Nonwar Business—Preference in Raw Material Supplies for War Production Will Force Curtailment—Board Outlines Its Policies

WASHINGTON, May 28.—No formal classification of nonessential industry will be undertaken by the war industries board, but priority regulations of the distribution of necessary materials and supplies will serve to sharply draw the line of demarcation between useful and nonuseful production under war conditions. By this means, the war industries board, acting through its priorities board, promises to bring about a sweeping readjustment of industry by checking the life blood of many plants, namely the basic raw materials and products. This consequence plainly is foretold by the official statement of the war industries board that direct and indirect war work will either so exhaust and reduce the available supply of raw materials as to cause an acute shortage, to any other branch of consumption.

The war industries board is expecting non-essential industry to take a large part itself in bringing about this adjustment to conform to the new conditions. By so doing it is hoped that the process of squaring industry with war demands may be brought about in a gradual and orderly fashion and without the exercise of any drastic methods.

The purposes of the war industries board as they apply to the regulation of nonessential industry are clearly set forth in a statement of priority policies, which has been made in its behalf by Chairman Bernard M. Baruch. This classifies the forms of demand for which preferential treatment will be accorded and defines the policy with respect to new construction. The statement is as follows:

"In pursuance of the authority expressly conferred by the President in appointing the undersigned chairman of the war industries board, there has been created a priorities board consisting of (1) the chairman of the war industries board, (2) the priorities commissioner, (3) a member of the railroad administration, (4) a member of the United States shipping board and Emergency Fleet corporation, (5) a member of the war trade board, (6) a member of the food administration, (7) a member of the fuel administration, (8) a representative of the war department, (9) a representative of the navy department, and (10) a member of the allied purchasing commission.

"As this board is composed of authorized representatives of the governmental agencies principally concerned with war industries and supplies, it is not only peculiarly fitted to determine general principles and define basic rules which shall govern priorities of production and delivery of materials, equipments and supplies, but also as pointed out by the President, its composition insures 'common, consistent and concerted action' in carrying such determinations into effect.

"For the guidance of all governmental agencies in the production, supply and distribution of raw materials, finished products, electrical energy, fuel and transportation by rail, water, pipe lines and otherwise, the priorities board has adopted the accompanying general classification of purposes demanding preference treatment.

"The several governmental agencies, as well as the industries and all others affected, can without much difficulty apply this general classification of purposes, which must be accorded preference treatment, to the industries and plants with which they may be concerned. The priorities board will, however, from time to time promulgate in the form of 'preference lists' not only classes of industries but individual plants whose operations as a war measure are of exceptional importance and which shall be classified as far as practicable in the order of their relative urgency measured by the extent of their direct or indirect contribution (a) toward winning the war and (b) toward promoting the national welfare. In the meantime the foregoing general classification of purposes should prove of particular interest to the nonwar industries and of value to them in planning their future activities during the remainder of the calendar year 1918, when the basic materials entering into the manufacture of many products will be largely, if not entirely, absorbed in direct and indirect war work, and transportation both by rail and water will be acutely congested in several sections, resulting in the curtailment of production and distribution of such basic materials."

"The war industries board earnestly urges each nonwar industry to look the situation squarely in the face now and plan accordingly, curtailing where necessary operations not falling

General Classification of Priority Purposes

(Including all necessary raw materials, partially manufactured parts and supplies for completion of product.)

Ships

Including destroyers and submarine chasers.

Aircraft

Munitions, Military and Naval Supplies and Operations

Building construction for government needs; equipment for same.

Fuel

Domestic consumption and manufacturing necessities named herein.

Food and Collateral Industries

Foodstuffs for human consumption and plants handling the same.

Feeding stuffs for domestic fowls and animals, and plants handling the same.

All tools, utensils, implements, machinery and equipment, required for production, harvesting and distribution, milling, preparing, canning and refining foods and feeds, binder twine, etc.

Products of collateral industries, such as fertilizers, fertilizer ingredients—insecticides and fungicides, containers for foods and feeds, collateral products.

Materials and equipment for preservation of foods and feeds, such as ammonia and other refrigeration supplies including ice.

Clothing

For civilian population.

Railroad

Or other necessary transportation equipment, including water transportation.

Public Utilities

Serving war industries, army, navy and civilian population.

within the general classification of purposes demanding preference treatment, as hereinbefore defined, and at the same time, where practicable, converting existing facilities and utilizing existing organizations for purposes entitled to preference treatment, thus reducing the damage to industry to a minimum, and at the same time relieve some of the war industries that are staggering under the abnormal burdens which they are carrying.

"The following resolution was on March 21, 1918, unanimously adopted by the war industries board:

"Whereas it has come to the notice of this board that new industrial corporations are being organized in different sections of the United States, for the erection of industrial plants which cannot be utilized in the prosecution of the war, and

"Whereas plans are being considered by certain states, counties, cities and towns for the construction of public buildings and other improvements which will not contribute toward winning the war, and

"Whereas the carrying forward of these activities will involve the utilization of labor, materials and capital urgently required for war purposes: now, therefore, be it

"Resolved, By the war industries board, that in the public interest, all new undertakings not essential to and not contributing either directly or indirectly toward winning the war, which involve the utilization of labor, material and capital required in the production, supply or distribution of direct or indirect war needs, will be discouraged notwithstanding they may be of local importance and of a character which should in normal times meet with every encouragement; and be it further

"Resolved, That in fairness to those interested therein notice is hereby given that this board withhold from such projects priority assistance, without which new construction of the character mentioned will frequently be found impracticable, and that this notice shall be given wide publicity, that all parties interested in such undertakings may be fully apprised of the difficulties and delays to which they will be subjected and embark upon them at their peril."

"While this resolution is self-explanatory, it may not be improper to say here that the war industries board has not undertaken to classify any legitimate industry as 'nonessential' but only through the exercise of priority directions to insure supplying to direct and indirect war industries as nearly as possible 100 per cent of their requirements. From the surveys which the board has been able to make, and the data and information it has assembled, it seems reasonably certain that the giving to those industries engaged in direct and indirect war work 100 per cent of their requirements for such work will in some cases practically exhaust, and in others very substantially reduce, the available supply, resulting in an acute shortage of certain basic raw materials and products. This being true, duty impels the war industries board to call this situation thus pointedly to the attention of all interested parties, that they may, acting independently and with such assistance as this board may be able to extend, make their plans accordingly.

"This board needs, welcomes and confidently expects to receive the active assistance and whole-hearted co-operation of the business men of this nation, that it may to the fullest extent enjoy and have the benefit of their knowledge, judgment and experience."

Capital Odds and Ends

WASHINGTON, May 28.—Application for licenses to export those commodities now being considered for exportation to Sweden and European Holland will also be considered for exportation to Denmark, the war trade board has announced. On these shipments the importer abroad must obtain an import certificate from the Danish Merchant's Guild. Procedure is then according to the prevailing practice. The list of commodities to be considered for exportation include: pianos, spare parts or replacement parts of machinery, surgical and medical appliances except those containing rubber, toys, pen nibs, spare parts of textile and brewing machinery, sewing machines, imitation jewelry, cash registers, laundry machinery except that containing rubber or copper, phonographs, scales and balances not containing nickel or tin and sugar refining machinery.

Establishment of a rule for a deduction of two and one half per cent for moisture from the actual net weight of coal weighed within 24 hours after being washed observing as the maximum the marked capacity of cars, is asked by the Illinois Central railroad.

American imports in April reached a value of $279,000,000 an increase over March when the value was $242,000,000, according to a statement issued by the bureau of foreign and domestic commerce. Their value for the 10 months ending with April was $2,362,000,000 as compared with $2,072,000,000 for the corresponding period in 1917. April exports however, were $30,000,000, less in April than in March while in comparison of the 10 months periods a decrease of $5,167,000,000 is shown in the period ending in April 1918.

Increases of from 20 to 32 cents per barrel in the charges for gathering and transporting oil from wells to delivery points within the state of Pennsylvania or to delivery points on the South West Pennsylvania Pipe Lines in the state of Pennsylvania is sought by the South West Pennsylvania Pipe Lines.

The Utah railroad desires the following increases in switching rates on coal in carloads, including spotting of empty cars: $1.00 per car from coal tipple at Mohrland, Utah; $2.00 per car from coal tipple at Black Hawk to Hiawatha, Utah; $3.00 per car from coal tipple at East Hiawatha to Hiawatha, Utah; and $2.00 from Panther to Panther Station, Utah.

The interstate commerce commission has denied the application for cancellation of the present joint rates on carload coal from Arkansas, Oklahoma and Missouri, made by the Midland Valley, the Kansas City Southern and the Missouri, Oklahoma & Gulf railroads. This application was made primarily to prevent delay of cars, to relieve congestion and to increase the railroad's revenues through greater use of their own cars.

Petroleum, asphalt or tar products required for the construction, maintenance, or reconstruction of roads will be delivered only after approval by a committee representing the fuel administration and the office of public roads. This plan is to prevent further deterioration of roads requiring oils and tar and at the same time to conserve these products for war work. State highway departments to which notices of the restrictions have been sent, are required to pass upon all applications for highway work in their territories.

Upon request of the territorial council of defense of Alaska the fuel administration is considering the appointment of a fuel administrator for Alaska coal fields, work hitherto done by the administrator of the state of Washington. In spite of immense undeveloped coal fields Alaska imports much coal from Washington and British Columbia. The territory contains perhaps as much coal as the fields of Pennsylvania, and the opening of new mines, transportation, wharfage, loading and unloading where both boat and rail is required will furnish many problems for the administrator when he is appointed.

Jobbers Will Cut Nonwar Demands

Metal Branch of National Hardware Association Shows Members Are Intent Upon Serving Government Freely—Urge Conservation of Steel Supply—Sheet and Tin Plate Conditions Are Reviewed

STRESS was laid upon the necessity of hardware makers, jobbers and dealers conserving the supply of steel as much as possible and to eliminate all less essentials, at the seventh annual meeting of the metal branch of the National Hardware Association of the United States, held in the William Penn hotel, Pittsburgh, May 24 and 25. Reports made and expressions of members of the metal branch showed that the association is serving the government in every manner possible and has disregarded its own business interests. After-war problems also were discussed. The meeting was presided over by W. H. Donlevy, Carter, Donlevy & Co., Philadelphia, chairman of the metal committee, who was unanimously re-elected.

In the course of remarks made by Robert Garland, president of the chamber of commerce of Pittsburgh, speaking on "Opportunity for Foreign Trade After the War", he said that unless business organizations immediately take up the study of this question, as England now is doing, the industries of the United States will find themselves in an abject state of unpreparedness to meet conditions after peace has been restored. The United States, he declared, must prepare to take Germany's prewar trade. Co-operation among all kinds of civic bodies, such as chambers of commerce, was suggested so that the country will be supplied with a proper merchant marine, and marine insurance facilities, banking facilities all over the world, and a fair tariff.

More Freight Advances Coming

L. C. Bihler, traffic manager of the Carnegie Steel Co., spoke on "Traffic Conditions", and dealt with their chaotic state as the result of the war. He mentioned work that is being done by the railroad administration and the rail lines themselves to remedy the situation so far as possible. It will take time, he said, to get things to a point where they will again be running more smoothly. More revenue is needed, Mr. Bihler said, and he informed the bearers that "it is in the cards to increase all freight rates 25 per cent above advances that have been put into effect. Wider use of team, trolley and truck service was recommended as a measure of relief for the railroads. The government plan to have all freight charges prepaid, said Mr. Bihler, will mean a heavy drain of the surplus money of manufacturers, the effect of which it is too early to predict.

Demand for steel for the United States government and the allies is so great that an acute shortage was predicted by John A. Penton, Cleveland, publisher of THE IRON TRADE REVIEW.

Predicts Steel Shortage

With the government preparing to hurry an army of 5,000,000 men to France, calling for enormous tonnages of steel for ships, ordnance, railroad cars and related essentials, Mr. Penton expressed the opinion that there will be no steel available for commercial purpose for the next two years. Steel men, he asserted, are greatly concerned over the situation for fear that they will be unable to supply demands for war purposes.

"It is a question now," said Mr. Penton, "as to how we are going to make two tons of pig iron 'grow' where one ton 'grew' heretofore. The answer, I think, is to make one ton do what two tons have done before." The speaker urged the hardware men to do their utmost to eliminate less essentials altogether and in order to concentrate a plan of conservation of steel to organize a committee for the purpose of co-operating with a subcommittee of the American Iron and Steel institute recently selected by the war industries board to study this problem thoroughly.

In a paper on "Roofing Products", H. L. McKenzie, sales manager of the Canton Sheet Steel Co., Canton, O., said that it is well, in these days when sheet metal roofing has been temporarily sidetracked for the manufacturers and jobbers to awake to the realization of the dwindling use of sheet metal roofing in certain territories. Mr. McKenzie stated that from a mill standpoint, it would seem the proper method to sell roofing by the pound, as developments in recent years of practice promulgated by some interests in the way of standard converting charges, have forced roofings into the tonnage class and the finished article, which should enjoy a class by itself, is seemingly sunk into oblivion.

"It would seem," he continued, "that in the process of manufacture, in which there are distinct stages, and in which in each stage there is more or less skill required and in which there is demanded special treatment, also to separate advertising and selling expense, would enter into a distinct fabricated class, which should carry a legitimate profit commensurate with the extra treatment and expense involved in entering said class.

"Question:—Are differentials added to flat sheets sufficient?

"From a mill standpoint, the only correct way of selling roofing is by the pound, due to the fact that this slight differential and other reasons which have a tendency in normal times to incite buyers to employ shady tactics in demanding roofing rolled light to gage.

"You will therefore see that a jobber in buying by the pound and selling roofing by the square based on the full theoretical weight, is gainer by the transaction, but at the expense of the producer and at the expense of quality, which every manufacturer and dealer should use his utmost to safeguard against.

"On the other hand the plan of selling roofing on the square basis should have the unprejudiced consideration of the mills, or, in other words in view of the jobber, dealer and ultimate consumer being necessary adjuncts, their wishes should have some consideration and they should have a voice in the matter."

Jobbers Want War Footing

In presenting the report of the metal committee chairman Mr. Donlevy said that the speeding up of war industries may be assisted through co-operation of wholesale distributors. Hope was expressed that plans may be evolved which will assist in getting "our business on a government basis so that priority may be given in the production and shipment of products to our warehouses in order to expedite work on important government contracts."

Continuing, Mr. Donlevy said, in part:

"It has been recognized and admitted on several occasions that the

war progress has been substantially speeded up through the quick supply of needed materials from the wholesalers' stocks, and if it would have been necessary to have waited for the manufacturer to produce and deliver the material, two or three months' delay could readily have been ensued. Of course, it is recognized that this applies to the local needs which it was necessary to supply and does not refer to such great quantities of material as involved in the shipbuilding and other extensive programs.

"Some comments have been heard from Washington regarding what they call the middleman and we would explain from the best evidence we can secure reference is not made to the wholesale distributor who has a properly capitalized business and who has a warehouse containing a substantial stock of the materials in which he deals, but that by middleman Washington authorities refer to a large number of brokers or manufacturers' agents who have sprung up since the war and who have harrassed, annoyed and disappointed responsible officials of the government who had reason to believe that they were dealing with well-established concerns.

"The engineering depot of the United States army has recently issued a card which they require bidders to fill out and which will guard against such irresponsible brokers and which specifically says that the government is willing to deal with either the manufacturer or the wholesale distributor."

E. Theodore Spoull, general manager of sales of the Trumbull Steel Co., Warren, O., presented a paper on "Present Situation in Manufacture and Sale of Sheets and Tin Plate." Speaking of the war, he said:

"The steel industry has offered its all, its best men, weakening its producing ability but is backing these men up, and millions of others, with steel and more steel. Every manufacturer of steel has most willingly signed the pledge offered by Judge Gary at the recent historical meeting in New York. All steel representatives present not only signed the pledge, but have gotten back of it with the force of each and every member or his corporation.

"The sheet and tin mill branches of the steel industry have established themselves firmly with the government by showing a disposition from the very beginning to co-operate and furnish any part or all of their production for war purposes. To do this naturally meant disappointment to many of their most loyal customers. Much tonnage on order was continually pushed back on the rolling schedules to make way for the more urgent war orders. Government orders were allocated in large tonnages to the various sheet mills through the subcommittee of the American Iron and Steel institute. More government orders came direct from the navy and other governmental purchasing agencies, all of which rapidly filled up the available capacity of the sheet mills and left little, if any, room for commercial business, although much of this tonnage asked for by the commercial trade was needed and could be traced step by step to a point where it actually was going to serve a part in the war program. Due, however, to its deferred classification, it had to be considered in the list of so-called nonessentials. Some months ago, seeing the present situation developing rapidly, the organization I have the pleasure to represent wrote to all their jobbing customers and asked for information as to what part of the tonnage on order could be considered in a priority class. Many replies of an interesting nature were received, and, without exception, each and every one made it clear that the jobber was doing a noble service. On the Pacific and Atlantic coasts, as well as the Great Lakes district, stocks were being utilized and depleted by consumers doing direct and urgent war work, principally building of ships, warehouses and shelter houses for soldiers and supplies. In the central west, south and southwest, stocks were being distributed to the farming and agricultural trade, which means more food for the armies and the millions of workers at home.

"Some of the principal jobbers have realized the acute conditions and have made every attempt to conserve their stocks for uses of the most essential class. One jobber has refused to accept orders unless information accompanies the order declaring the purpose of the material. The result has been gratifying and satisfactory, as the jobber has his business practically on a 100 per cent government basis.

"The sheet industry realizes the value of the jobber and offers all assistance possible to promote and develop their business so that they may continue to fill their place in the united effort to win the war. It is to be hoped that soon their place will be more appreciated and gain for them the proper classification to enable the mills to continue shipments and keep up their stocks.

"The tin plate branch of the steel industry is of the most importance, as it comes in contact directly with the big question of providing food for the armies of our country, as well as the armies of our noble allies. Food Administrator Hoover has worked untiringly to stimulate the production of foodstuffs, and it is estimated that fully 22,000,000 base boxes of tin plate will be required to properly preserve the crop production of this country, and fully 5,000,000 base boxes additional for our allies, a total of 27,000,000 base boxes against a possible production of 35,000,000 base boxes on a 100 per cent operating basis. It leaves very little tin plate for uses other than food. The mills are exerting every effort to fill their part of the program and much steel is going into the manufacture of tin plate as the sacrifice of some less essential product."

Eight Hour Day

Declared Drag on War Progress by Association of Manufacturers

That industry should, will win and is winning the war was the basis of all the papers and discussion presented at the twenty-third annual convention of the National Associaton of Manufacturers, held at New York, May 20, 21 and 22. This culminated in the passage of a resolution which in effect, recommended to congress the abolishment of the 8-hour law on government work. The resolution declared that the operation of such legislation hampers production and hinders this country's effort in the war. Another resolution was passed at the final session, urging the wider adoption of trade acceptances, and the organization likewise went on record by resolution, as indorsing the work of the American Institute of Weights and Measures in opposition to the metric system in this country.

Conservation of man power, mechanical reorganization, fuel, transportation, industrial housing, finance, export trade developments are some of the subjects which were discussed at the meeting.

Personality, publicity and patriotism were the three factors pointed out by James O. Fagan, Waverly, Mass., of the National Industrial Conservation movement, as being needed by American industry in the war. He said that the President proved that personality was needed by calling the army of over 600 business men to Washington to aid the government.

Charles S. Page of the United States shipping board, Washington, dealt at length with the shipping problem, with relation to the transportation of exports in war times.

More Scrap is Essential

Dealers in Annual Meeting Pledge Themselves to Procure All Available Supplies and Ask Government's Full Support

OFFICERS were re-elected and by-laws revised at the first annual meeting of the American Board of Scrap Iron Dealers at the Fort Pitt hotel, Pittsburgh, May 22. The officers and executive committee selected were: President, William J. Shroeder, Joseph Joseph Bros., Cincinnati; vice president, Sam Dentsch, Chicago; secretary-treasurer, C. A. Barnes, Philadelphia; executive committee, A. J. Bialosky, one year; Charles Dreifus, Charles Dreifus Co., Pittsburgh, one year; Harry S. Grant Iron & Metal Co., Detroit, one year; Ely Joseph, Joseph Joseph Bros., New York City, one year; Joseph Michaels, the Hyman-Michaels Co., Chicago, two years; W. Vernon Phillips, Philadelphia, two years; Henry P. Rees, two years.

The meeting was attended by about 60 members. Through a resolution adopted the members both as individuals and as a board pledged themselves to serve the government in every way possible to insure an adequate supply of scrap for war use. The meeting went on record as being opposed to the fixing of a price on mixed scrap.

President Shroeder in his annual report recommended that steps be taken to secure accurate information through co-operating with other bodies to show the fuel and railroad administrations the part taken in the production of iron and steel by dealers and shippers in order that the scrap trade be given proper consideration as to supplies of fuel and open-top cars.

Chairman W. Vernon Phillips, of the subcommittee on iron and steel scrap of the American Iron and Steel institute, made a stirring address. His remarks, in part, follow:

Our next big problem will be the procurement of sufficient scrap, and it is here that the American Board of Scrap Iron Dealers will have an opportunity to show whether it means what it says in its constitution, and when that time comes the government is very likely to come to you as an organization (at least if I continue in charge) and ask you to constitute yourselves into an industrial army for the purpose of bringing every last ton of scrap to the markets, not for profit, but as soldiers doing a duty, helping to save your country, to build ships, to make guns, to make shells, to make stretchers and hospital cots, yes, even to make crutches for the boys we are sending over. An order is being given this week for 750,000 cots for wounded men—think of it—750,000—and every pound of those cots is going to be made from scrap. I know, for I have been asked to see that the mill is supplied properly.

The government wants everybody to make a profit because it wants them to keep on working, working as hard as they can. Nearly one-third of the steel in the country is made from scrap, and while a lot of the scrap would reach the markets without the aid of the dealer, the portion that would not get there would be sufficient to upset the entire war program; in fact, a large portion of the mills would very quickly be shut down. This is not said for the purpose of showing how important you are, but what a great duty and privilege you have and you should all be thankful to feel that in doing your normal work, you are helping to win.

There is no great honor in buying a couple of thousand tons from some large manufacturer or railroad and selling to a consumer. It is helpful and no doubt assists both the producer and consumer, but it would get there anyhow. It is the man that actually locates material, prepares it, and delivers it to a mill that is really serving and helping the country. Every ton of material reclaimed that would not otherwise be available is a step toward victory and peace, and this carries us down to the smallest collector.

President William J. Shroeder in his annual report, said:

There is no branch of the steel and iron industry whose importance is so little understood and whose functioning is so misunderstood, as that of the dealer in scrap iron and steel. The importance of scrap iron and steel to the steel and iron industry can best be understood upon consideration of the tonnages handled, and the proportions of such tonnages to the total output of the three principal producing agencies, which are the steel mill, the rerolling and bar mill and the foundries.

Over 16,000,000 tons, or more than 33-1/3 per cent of the total output of 1917, was produced from market scrap, which excludes the output produced from the mills' own scrap production. Between 30 and 40 per cent of the entire steel mill output, more than 90 per cent of the rerolling and bar mill output, and more than 50 per cent of the foundry output was produced from market scrap.

Fuel administrations are apt to overlook the fundamental character of the scrap yard in its preparation of scrap for mill consumption. Not being familiar with the industry, persons preparing preferred lists of those to receive fuel when all cannot be served, cannot, unless we supply the information, be expected to know that without fuel for the operation of yard engines, cranes and the manufacture of power for the operation of shears, conveyors and drops, scrap material cannot be prepared for mill consumption and that without such scrap material the government's program, so far as it involves steel products, cannot be carried out.

Announce Further Revisions of Extras

A FURTHER modification of the revised method of invoicing sketch plates, announced May 21, has been put out by Chairman E. H. Gary, of the general iron and steel committee of the American Iron and Steel institute under date of May 25. This latest announcement is as follows:

In announcing revised maximum prices, differentials, and extras under date of May 21, 1918, it was stated that the revised method of invoicing sketch plates should be added to the extras for irregular sketches shown on page 34 of the institute pamphlet. It has been pointed out that this might be construed to mean that the revised basis for invoicing sketch plates would apply to irregular sketches only. It is the intention of the committee that the revised basis for invoicing sketch plates shall apply to all sketches. In order to remove any doubt as to such intention the announcement of May 21, 1918, in regard to steel plates is hereby cancelled and the following substituted therefor:

STEEL PLATES

Between the extras for irregular sketches shown on page 34 of the institute pamphlet (pages 17-18 IRON TRADE REVIEW booklet) and the extras for circles shown on the same page, insert the following to govern extras for both regular and irregular sketches:

"Sketch plates (other than those sheared to a radius) will be invoiced at actual weight of the sketch, at the base price plus standard card extras (including sketch extras), with an additional charge for waste, if any, to be determined by deducting the actual weight of each sketch from the estimated table weight of the smallest rectangular plate from which said sketch can be secured, the difference to be invoiced at the rectangular plate price, less an allowance for the value as scrap, at the price fixed by the government for No. 1 heavy melting scrap."

Cancel the first item under the sub-heading "Special" on page 34, reading as follows:

"Wasteful or difficult sketches, including hexagons, octagons, etc., are subject to special extras."

Considerable interest has been shown in the trade in the new separate extra and differential lists on hoops and bands which were announced by Chairman Gary, May 21. As previously stated, extras on these products

formerly were figured on the steel bar card. The new differentials and extras also cover hot rolled strip steel of all qualities.

Chairman Gary's complete announcement of May 21, covering steel bands, hoops and strips, which could not be published in last week's issue because of lack of space, is given below:

STEEL BANDS, HOOPS AND STRIPS

Base price and extras for steel bands, hoops and strips, recommended by the committee on steel and steel products of the American Iron and Steel institute, May 21, 1918.

(Per 100 pounds, f. o. b., Pittsburgh)

Steel bands	$3.50
Steel hoops	3.50
Hot rolled strip steel	3.50

Subject to following list of extras and differentials:

EXTRAS FOR SIZE

Thickness

Width, inches	Gage, inches	Decimal	Extra for size
3/8	5/16	0.1875	0.75c
	7	0.180	0.75c
	8	0.165	0.75c
	9	0.148	0.75c
	10	0.134	1.00c
	1/8	0.125	1.00c
	11	0.120	1.00c
	12	0.109	1.00c
	13	0.095	1.10c
	14	0.083	1.10c
	15	0.072	1.20c
	16	0.065	1.30c
	17	0.058	1.45c
	18	0.049	1.60c
7/16	5/16	0.1875	0.70c
	7	0.180	0.70c
	8	0.165	0.70c
	9	0.148	0.70c
	10	0.134	0.85c
	1/8	0.125	0.85c
	11	0.120	0.85c
	12	0.109	0.85c
	13	0.095	0.90c
	14	0.083	0.90c
	15	0.072	0.90c
	16	0.065	1.00c
	17	0.058	1.10c
	18	0.049	1.35c
	19	0.042	1.50c
1/2	5/16	0.1875	0.45c
	7	0.180	0.45c
	8	0.165	0.45c
	9	0.148	0.45c
	10	0.134	0.55c
	1/8	0.125	0.55c
	11	0.120	0.55c
	12	0.109	0.55c
	13	0.095	0.65c
	14	0.083	0.65c
	15	0.072	0.65c
	16	0.065	0.75c
	17	0.058	0.75c
	18	0.049	0.80c
	19	0.042	0.85c
	20	0.035	0.95c
	21	0.032	1.15c
	22	0.028	1.35c
9/16	5/16	0.1875	0.40c
	7	0.180	0.40c
	8	0.165	0.40c
	9	0.148	0.40c
	10	0.134	0.45c
	1/8	0.125	0.45c
	11	0.120	0.45c
	12	0.109	0.45c
	13	0.095	0.55c
	14	0.083	0.55c
	15	0.072	0.55c
	16	0.065	0.65c
	17	0.058	0.65c
	18	0.049	0.70c
	19	0.042	0.75c
	20	0.035	0.85c
	21	0.032	1.00c
	22	0.028	1.15c
	23	0.025	1.35c
5/8	5/16	0.1875	0.40c
	7	0.180	0.40c
	8	0.165	0.40c
	9	0.148	0.40c
	10	0.134	0.45c
	1/8	0.125	0.45c
	11	0.120	0.45c
	12	0.109	0.45c
	13	0.095	0.50c
	14	0.083	0.50c
	15	0.072	0.50c
	16	0.065	0.60c
	17	0.058	0.60c
	18	0.049	0.65c
	19	0.042	0.70c
	20	0.035	0.80c
	21	0.032	0.95c
	22	0.028	1.10c
	23	0.025	1.30c
11/16	5/16	0.1875	0.30c
	7	0.180	0.30c
	8	0.165	0.30c
	9	0.148	0.30c
	10	0.134	0.40c
	1/8	0.125	0.40c
	11	0.120	0.40c
	12	0.109	0.40c
	13	0.095	0.45c
	14	0.083	0.45c
	15	0.072	0.45c
	16	0.065	0.55c
	17	0.058	0.55c
	18	0.049	0.60c
	19	0.042	0.65c
	20	0.035	0.75c
	21	0.032	0.90c
	22	0.028	1.05c
	23	0.025	1.25c
3/4	5/16	0.1875	0.30c
	7	0.180	0.30c
	8	0.165	0.30c
	9	0.148	0.30c
	10	0.134	0.35c
	1/8	0.125	0.35c
	11	0.120	0.35c
	12	0.109	0.35c
	13	0.095	0.40c
	14	0.083	0.40c
	15	0.072	0.40c
	16	0.065	0.50c
	17	0.058	0.50c
	18	0.049	0.55c
	19	0.042	0.60c
	20	0.035	0.65c
	21	0.032	0.75c
	22	0.028	0.95c
	23	0.025	1.20c
13/16	5/16	0.1875	0.20c
	7	0.180	0.20c
	8	0.165	0.20c
	9	0.148	0.20c
	10	0.134	0.30c
	1/8	0.125	0.30c
	11	0.120	0.30c
	12	0.109	0.30c
	13	0.095	0.40c
	14	0.083	0.40c
	15	0.072	0.40c
	16	0.065	0.50c
	17	0.058	0.50c
	18	0.049	0.55c
	19	0.042	0.60c
	20	0.035	0.65c
	21	0.032	0.75c
	22	0.028	0.95c
	23	0.025	1.20c
7/8	5/16	0.1875	0.15c
	7	0.180	0.15c
	8	0.165	0.15c
	9	0.148	0.15c
	10	0.134	0.25c
	1/8	0.125	0.25c
	11	0.120	0.25c
	12	0.109	0.25c
	13	0.095	0.30c
	14	0.083	0.30c
	16	0.065	0.35c
	15	0.072	0.30c
	17	0.058	0.40c
	18	0.049	0.40c
	19	0.042	0.45c
	20	0.035	0.55c
	21	0.032	0.65c
	22	0.028	0.85c
	23	0.025	1.10c
15/16	5/16	0.1875	0.10c
	7	0.180	0.10c
	8	0.165	0.10c
	9	0.148	0.10c
	10	0.134	0.15c
	1/8	0.125	0.15c
	11	0.120	0.15c
	12	0.109	0.15c
	13	0.095	0.20c
	14	0.083	0.20c
	15	0.072	0.20c
	16	0.065	0.25c
	17	0.058	0.25c
	18	0.049	0.30c
	19	0.042	0.35c
	20	0.035	0.45c
	21	0.032	0.65c
	22	0.028	0.85c
	23	0.025	1.10c
1	5/16	0.1875	0.05c
	7	0.180	0.05c
	8	0.165	0.05c
	9	0.148	0.05c
	10	0.134	0.15c
	1/8	0.125	0.15c
	11	0.120	0.15c
	12	0.109	0.15c
	13	0.095	0.20c
	14	0.083	0.20c
	15	0.072	0.20c
	16	0.065	0.25c
	17	0.058	0.25c
	18	0.049	0.30c
	19	0.042	0.35c
	20	0.035	0.45c
	21	0.032	0.65c
	22	0.028	0.85c
	23	0.025	1.10c
1 1/16 to 1 3/16	5/16	0.1875	0.05c
	7	0.180	0.05c
	8	0.165	0.05c
	9	0.148	0.05c
	10	0.134	0.10c
	1/8	0.125	0.10c
	11	0.120	0.10c
	12	0.109	0.10c
	13	0.095	0.15c
	14	0.083	0.15c
	15	0.072	0.15c
	16	0.065	0.20c
	17	0.058	0.25c
	18	0.049	0.25c
	19	0.042	0.30c
	20	0.035	0.45c
	21	0.032	0.65c
	22	0.028	0.85c
1 1/4 to 2	5/16	0.1875	Base
	7	0.180	Base
	8	0.165	Base
	9	0.148	Base
	10	0.134	0.05c
	1/8	0.125	0.05c
	11	0.120	0.05c
	12	0.109	0.05c
	13	0.095	0.10c

	14	0.083	0.10c
	15	0.072	0.10c
	16	0.065	0.10c
	17	0.058	0.15c
	18	0.049	0.20c
	19	0.042	0.25c
	20	0.035	0.50c
	21	0.032	0.70c
	22	0.028	0.95c
2 1/16 to 2 1/2	5/16	0.1875	Base
	7	0.180	Base
	8	0.165	Base
	9	0.148	Base
	10	0.134	0.05c
	1/8	0.125	0.05c
	11	0.120	0.05c
	12	0.109	0.05c
	13	0.095	0.10c
	14	0.083	0.10c
	15	0.072	0.10c
	16	0.065	0.15c
	17	0.058	0.20c
	18	0.049	0.30c
	19	0.042	0.40c
	20	0.035	0.60c
	21	0.032	0.90c
2 5/16 to 3	5/16	0.1875	Base
	7	0.180	Base
	8	0.165	Base
	9	0.148	Base
	10	0.134	0.05c
	1/8	0.125	0.05c
	11	0.120	0.05c
	12	0.109	0.05c
	13	0.095	0.10c
	14	0.083	0.10c
	15	0.072	0.10c
	16	0.065	0.15c
	17	0.058	0.20c
	18	0.049	0.30c
	19	0.042	0.40c
	20	0.035	0.60c
	21	0.032	1.00c
3 1/16 to 3 1/2	5/16	0.1875	Base
	7	0.180	Base
	8	0.165	Base
	9	0.148	Base
	10	0.134	0.05c
	1/8	0.125	0.05c
	11	0.120	0.05c
	12	0.109	0.05c
	13	0.095	0.10c
	14	0.083	0.15c
	15	0.072	0.20c
	16	0.065	0.30c
	17	0.058	0.40c
	18	0.049	0.55c
	19	0.042	0.75c
	20	0.035	1.00c
3 5/16 to 4	5/16	0.1875	Base
	7	0.180	Base
	8	0.165	Base
	9	0.148	Base
	10	0.134	0.05c
	1/8	0.125	0.05c
	11	0.120	0.05c
	12	0.109	0.05c
	13	0.095	0.10c
	14	0.083	0.15c
	15	0.072	0.20c
	16	0.065	0.30c
	17	0.058	0.45c
	18	0.049	0.70c
	19	0.042	0.90c
	20	0.035	1.15c
4 1/16 to 5	5/16	0.1875	Base
	7	0.180	Base
	8	0.165	Base
	9	0.148	Base
	10	0.134	0.10c
	1/8	0.125	0.10c
	11	0.120	0.10c
	12	0.109	0.10c
	13	0.095	0.15c
	14	0.083	0.20c
	15	0.072	0.30c
	16	0.065	0.50c
	17	0.058	0.75c
	18	0.049	1.00c
	19	0.042	1.20c
	20	0.035	1.40c
5 1/16 to 6	5/16	0.1875	Base
	7	0.180	Base
	8	0.165	Base
	9	0.148	Base
	10	0.134	0.10c
	1/8	0.125	0.10c
	11	0.120	0.10c
	12	0.109	0.10c
	13	0.095	0.20c
	14	0.083	0.30c
	15	0.072	0.40c
	16	0.065	0.70c
	17	0.058	0.90c
	18	0.049	1.00c
	19	0.042	1.20c
6 1/16 to 8	5/16	0.1875	0.10c
	7	0.180	0.10c
	8	0.165	0.10c
	9	0.148	0.10c
	10	0.134	0.20c
	1/8	0.125	0.20c
	11	0.120	0.20c
	12	0.109	0.20c
	13	0.095	0.30c
	14	0.083	0.45c
	15	0.072	0.60c
	16	0.065	0.80c
	17	0.058	1.00c
	18	0.049	1.20c
8 1/16 to 10	5/16	0.1875	0.10c
	7	0.180	0.10c
	8	0.165	0.10c
	9	0.148	0.10c
	10	0.134	0.20c
	1/8	0.125	0.20c
	11	0.120	0.20c
	12	0.109	0.20c
	13	0.095	0.40c
	14	0.083	0.55c
	15	0.072	0.80c
	16	0.065	1.05c
	17	0.058	1.25c
	18	0.049	1.45c
10 1/16 to 12 1/2	5/16	0.1875	0.20c
	7	0.180	0.20c
	8	0.165	0.20c
	9	0.148	0.20c
	10	0.134	0.30c
	1/8	0.125	0.30c
	11	0.120	0.30c
	12	0.109	0.30c
	13	0.095	0.50c
	14	0.083	0.75c
	15	0.072	0.95c
	16	0.065	1.25c
12 5/16 to 15	5/16	0.1875	0.30c
	7	0.180	0.30c
	8	0.165	0.30c
	9	0.148	0.30c
	10	0.134	0.40c
	1/8	0.125	0.40c
	11	0.120	0.40c
	12	0.109	0.40c
	13	0.095	0.60c
	14	0.083	0.90c
15 1/16 and wider	5/16	0.1875	0.40c
	7	0.180	0.40c
	8	0.165	0.40c
	9	0.148	0.40c
	10	0.134	0.60c
	1/8	0.125	0.60c
	11	0.120	0.60c
	12	0.109	0.60c
	13	0.095	0.75c
	14	0.083	1.00c

Birmingham wire gage applies on this list. Extras are given in cents per pound.

Additional Extras

(In cents per lb. to be added to the base price per lb.)

For special stamping quality steel.. 50c extra

Cutting to length 60 inches and over on Special Stamping Quality Steel, without end pieces..... 10% extra

Cutting to Specified Lengths

Cutting to lengths of 60 inches and over ..... No charge

Cutting to lengths over 48 inches to 59 inches, inclusive..... 05c extra

Cutting to lengths over 24 inches to 48 inches, inclusive..... 10c extra

Cutting to lengths over 12 inches to 24 inches, inclusive..... 20c extra

Extra for cutting to specified lengths 12 inches and less will be furnished on application, but will not be less than..... 30c extra

For rounding one end of cut hoop and bands ..... 05c extra

For rounding both ends of cut hoop and bands ..... 10c extra

For intermediate gauges the extra for the next lighter gauge will be charged.

Rolling of lighter gauges than indicated on this list and the extras to apply are subject to special arrangements.

Extras for flaring and galvanizing will be quoted on application.

Extras for packing in barrels, casks and boxes will be quoted on application.

Exemptions

Extras for cutting and rounding one end of hoops will be waived on all widths when ordered in carload lots for cooperage purposes.

Quantity Differentials

All specifications for less than 2000 lbs. of a size will be subject to the following extras, the total weight of a size ordered to determine the extra regardless of length and regardless of exact quantity actually shipped.

Quantities less than 2000 lbs. but not less than 1000 lbs..... 15c extra

Quantities less than 1000 lbs..... 35c extra

Annealing ..... 30c extra

Slitting and Pickling Extras

Gauge—Inches	Slitting	Pickling
5/16, 7, 8 and 9	25	25
10, 11 and 12	25	25
13	25	30
14	25	35
15	40	40
16	40	45
17	40	50
18	55	55
19	55	60
20	55	65

Carbon Extras

For sizes 6 inches and narrower by 12 gauge or heavier:

If specified up to 0.20 per cent.. No extra

If specified 0.21 to 0.50 per cent. 05c extra

If specified 0.51 per cent and over. 15c extra

For other sizes and gauges, or special quality, carbon extras on application.

Specifications and Inspection

Material subject to Navy Department inspection ..... 10c extra

Navy Department high tensile steel 1.00c extra

Charges for other than mill inspection, such as Lloyd's or American Bureau of Shipping, for buyer's account.

The McLain-Carter Furnace Co., Milwaukee, has been awarded a contract by the Warren Steel Casting Co., St. Louis, for the installation of a 5-ton oil-fired open-hearth furnace. The furnace is to be completed in 45 days.

Obituaries

PROF. Frederick R. Hutton, who was secretary of the American Society of Mechnical Engineers, New York, for 24 years, becoming president in 1906, died suddenly May 14, aged 65. He was graduated from Columbia college with an A. B. degree in 1873 and three years later was granted the degree of the school of mines. The following year he became an instructor in mechanical engineering and in 1891 was made a professor but it was not until 1892 that he became head of the mechanical department of the college. He resigned in 1901 and for six years was dean of the faculty of applied science. He declined re-election as secretary of the society of mechanical engineers and at the organization's annual meeting in December, 1906, was unanimously elected president. He wrote several books on engineering subjects, among them being "Mechanical Engineering of Power Plants," "Heat and Heat Engines" and "The Gas Engine." Many articles and monographs both signed and unsigned, appeared in the transactions of the society as well in the trade journals. He served as consulting engineer in 1911 for the city of New York.

William Findlay, a retired steel merchant, died at his home in Millburn, N. J., May 17.

Israel Loucks, an organizer of the York Safe & Lock Co., died at his home in York, Pa., May 15, aged 91.

Busby P. Sweeney, superintendent of the Marion Steam Shovel Co., Marion, O., died suddenly at his home May 15, as he was celebrating his sixty-first birthday.

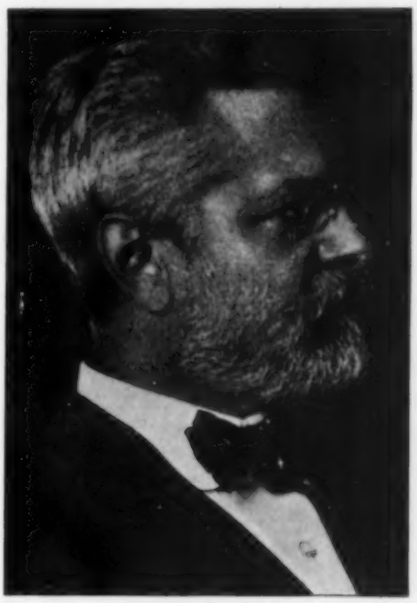
William Dewar Ellis, who was president of the Schenectady Locomotive Works when it was merged with the American Locomotive Co., some years ago, died, May 23, in New York, at the age of 63.

Claud R. Seager of the Waterworks Supply Co., San Francisco, formerly connected with the Chicago office of the American Radiator Co., was killed at Stockton, Cal., May 10, when an automobile in which he was riding struck the railing of a bridge.

Henry C. Fuller, affiliated for the past 26 years with the Crane Co., Chicago, and recently filling the office of assistant treasurer, died suddenly May 24 at Garfield Park hospital, Chicago. As assistant treasurer he succeeded R. B. Stiles, who was elected to that office upon the death of R. T. Crane early in 1912.

Leslie H. Colburn, 51 years old, general manager and one of the organizers of the Colburn Machine Tool Co., died on Sunday, May 26 at Franklin, Pa. He was one of the most widely known tool manufacturers in the United States.

Benjamin H. Richardson, who at one time was interested in an iron business with his father and uncles



PROF. FREDERICK R. HUTTON

under the firm name of Jeffrey Richardson and Bros., and later in the shipbuilding business, died at his home in Boston, May 22. He was born Aug. 17, 1835.

Ralph Waldo Wight, aged 43, treasurer of the Chapman Valve Mfg. Co., Indian Orchard, Mass., died in the New York Neurological institute, May 20. Pneumonia followed an operation. He was the owner of the Wight-Thayer Coal Co., and a director of the Hodges Fiber Carpet Co., both of Springfield, Mass.

Lieutenant Earl P. Williams, formerly vice president of J. H. Williams & Co., Brooklyn and Buffalo, N. Y., manufacturers of drop forgings, died May 8 at a hospital in Northampton, Mass. He received his commission as lieutenant after completing a course in the officers' training school, Fort Niagara, N. Y. His death was the result of an injury received at Camp Devens, Mass., May 7, when he was struck by a limb blown from a tree in a storm. He was a graduate of Yale university in 1910.

Calvin Pardee Jr., president and general manager of Pardee Bros. & Co., Inc., died May 13 at the state hospital, Hazleton, Pa., following an operation for appendicitis. He was 46 years old, and was a director of the Hazleton National bank, the Diamond Coal Land Co., C. Pardee Works at Perth Amboy, N. J., and Blackwood Coal & Coke Co., Blackwood, W. Va.

Lieut. Mortimer Park Crane, who was the son of Theron I. Crane, president of the Northern Ore Co., Widener building, Philadelphia, died recently in an airplane accident in England. He was 24 years old and an officer of the Royal Flying Corps. Prior to enlisting he was affiliated with his father in the Northern Ore Co.

George W. Retberg, general manager of the Cansburg Steel & Iron Works, Canonsburg, Pa., died at his home in that city, May 24. When a young man, Mr. Retberg located in Canonsburg, securing employment at the plant of the Canonsburg Iron & Steel Works. Soon after, the Parkersburg Iron & Steel Co. was organized and he became largely interested in it, being made assistant manager. After remaining with that company a short time, with the late John F. Budke and others, he formed the Canonsburg company.

Albert W. Gifford, aged 82, director and vice president of the Standard Screw Co., Worcester, Mass., died at his home in that city, May 23. In 1864 he founded the Worcester Machine Screw Co., remaining in control until 1900, when he sold it to the Standard Screw Co., which operates it as a subsidiary. He likewise was the founder of the hardware manufacturing concern, A. W. Gifford & Co., Worcester. When it went out of business several years ago, Mr. Gifford retired from active business life, although he remained financially interested in a number of Worcester's important industries. He was born in Sturbridge, Mass., Feb. 28, 1836, and located in Worcester in 1861. Shortly after, he commenced to make firearms for Union soldiers.

Appoints First Committee

National War Labor Board Names Initial Permanent Body to Take Charge of Industrial Disputes in St. Louis Territory

DESIGNED to inspire, promote and maintain industrial peace in America the functions of the national war labor board, of which ex-President Taft and James B. Walsh are the joint chairmen, include the appointment of permanent committees in industrial communities. The first of these has just been named and includes representatives of the workers and employers of St. Louis. Recommended by the central labor union of that city, Messrs. M. J. Cassidy, J. E. Woracek and David Kreyling represent the workmen upon the committee, while the following has been named for the employers, on the recommendation of the chamber of commerce and the Manufacturers' association: E. B. Pryor, president of the State National bank of St. Louis and director in many corporations in that city; Hudson S. Bemis, treasurer of the Bemis Bag Co., one of the largest manufacturers of bags and M. E. Singleton, who formerly was head of an oil corporation in East St. Louis, and who retired from active business with the exception of his position on the board of directors of the State National bank. Mr. Pryor is an authority on labor matters, having gained much experience while receiver of the Wabash railroad. Preliminary meetings have been held and active operations will commence in the near future, since approximately 15 strikes, involving 15,000 men and women are in progress.

What Committee Will Do

Vested with federal authority, this committee will act as the permanent agent of the national war labor board in endeavoring by counsel and conciliation to intercept and settle controversies threatening to arise in any St. Louis industries; to bring both sides together under the auspices of the federal government for the purposes of finding a basis of agreement when a controversy has arisen and in such other manner as may be suggested on different occasions, exert its effort for complete co-operation on the part of both labor and capital. Other committees will be named for other territories as needed.

When the permanent committee is unable to effect an agreement, it shall so report to the war labor board. A section of the board will then be named, composed of two of its members, which section shall visit the community and convene with the permanent committee. After hearings have been conducted and the case remains unadjusted, the matter shall be passed to the entire board.

Following the formation of the committee, Frank P. Walsh, who holds the chairmanship of the board jointly with former President William H. Taft, issued the following statement:

"The local committee of mediation and conciliation of the national war labor board will constitute the forums of industrial peace in the United States. On these committees capital and labor will work hand in hand with a single aim—to win the war. They know only one necessity, the maintenance of maximum production, and they know one common law—the principles established by the board as the basis for the government's mediating and conciliating action. These principles secure to the employer maximum production and guarantee to the worker his right to organization, healthy growth of the principles of democracy as applied to industry and the highest protection of his economic welfare."

Will Employ Older Men

The Bullard Machine Tool Co., Bridgeport, Conn., is about to inaugurate a campaign to fill its plant with citizens over draft age who are not now engaged in the making of war essentials. These men will be taught special branches of the machinist trade and will be paid extraordinary wages to start and will also be advanced rapidly. In a booklet entitled "Making Mechanics for the War—and After" the company states that "America has no room for idlers." S. H. Bullard, head of the company, stated recently, "the time required to become proficient in a given branch of the machinist's trade is wholly dependent on the individuals adaptability, skill and application to the work in hand."

Machinists Are Needed in Essential Plants

That nonessential manufacturers will be compelled to release large numbers of mechanics for war industries, now is believed to be a foregone conclusion if production is to be maintained or increased. It is authoritatively stated that lack of machinists and toolmakers is retarding war production work so that it now stands at but 75 per cent of maximum, by I. W. Litchfield, chief of the clearance section of the federal employment service, Washington. Calls for from 50 to 1500 machinists upon the federal employment service are numerous from many of the large war industries in different parts of the country. At least 10,000 could be employed at once to advantage. Most serious shortages exist in the east, where the manufacturing of war material is centralized. An appeal will be sent out in the near future by the federal employment service, asking machinists in all parts of the country to accept work in war plants. The enrollment of men in machinery work, including toolmakers and other skilled workers in metals by a nationwide canvas is contemplated.

Draft Creates Shortage

Co-incident with labor shortages in other sections of the country, the Youngstown and Mahoning valley districts report that the several drafts have created a more or less serious situation. It is becoming increasingly difficult to obtain skilled industrial workers to replace those who have been inducted into service, according to the statements of plant executives. Except in a few isolated cases, no exemptions on the ground of industrial necessity have been requested. One corporation which has lost approximately 1000 of its men by the operation of the draft law, has asked for less than a dozen exemptions. As far as is known, there is no contemplation of changing this policy, although heads of industry state frankly that a continuance of the draft calls will develop a situation hard to handle, since in many cases they will be called upon to maintain capacity production of essential war material, without the men to do it. Financial institutions are confronted with a similar difficulty and officials themselves discharge the routine duties while looking for men or training women to replace those who have gone into service.

Housing Work Continues

Within three months, it is hoped to have houses ready for occupancy in a model shipworkers' town to be located near Camden, N. J. Plans have been completed by the housing division of the Emergency Fleet corporation and work will shortly commence on the clearing away of the site. It will be known as Haddon township and approximately 3000 workers of the New York Shipbuilding Co., will be provided with dwelling places. The 907 houses will be mostly of brick construction, detached and in rows to cost on an average of $3070.

Men of the Iron Trade

Personal News of a Business Character Regarding the Men of Affairs of the Industry

WILLIAM G. MATHIAS, who in 1910 was made assistant general superintendent of the Tennessee Coal, Iron & Railroad Co.'s works at Ensley, Ala., and later was promoted to the position of general superintendent, has been appointed assistant to the vice president with offices in the Brown-Marx building, Birmingham. Prior to locating in Ensley, Mr. Mathias had been employed at the South Works of the Illinois Steel Co., at South Chicago, for 23 years. His first job was that of water boy. He has steadily advanced and when transferred to Alabama, was serving as superintendent of the structural and blooming mills at the South Works. As general superintendent of the Ensley works, he is succeeded by Karl Landgrebe, formerly assistant general superintendent. A. W. Allen, former superintendent of open-hearth furnaces, has been appointed assistant general superintendent to succeed Mr. Landgrebe. C. J. Barr, general superintendent of Fairfield works, has been made assistant to the vice president of the Fairfield Steel Co., Birmingham, a subsidiary of the Tennessee company. G. A. Miller succeeds Mr. Barr. He has been superintendent of mills at the Fairfield works. Mr. Barr is likewise assistant to the vice president of the Chickasaw Shipbuilding Co., Birmingham, another subsidiary.

F. P. Burgoyne, Lima, O., recently accepted a position as factory superintendent of the Modern Iron Works, Quincy, Ill.

E. S. Edwards has assumed his duties as eastern manager for the Stalnaker Steel Co., with headquarters at 1407-1408 Singer building, New York.

Dr. W. Irving Clark Jr., who has served the Red Cross in Paris, for several months, has returned to take up his work as medical director of the Norton Co., Worcester, Mass.

R. W. Ellingham recently resigned from the Bilton Machine Tool Co., Bridgeport, Conn., to become works manager of the Heald Machine Co., Worcester, Mass.

A. J. Hofman, secretary of A. M. Wood & Co., Inc., Philadelphia, resigned recently to organize and become president of the Hofman-Sproul Co., Widener building, that city, to deal in iron and steel scrap, with a yard at Chester, Pa. W. A. Faison was made vice president, T. J. Sproul treasurer and James McShane is secretary.

A. W. Sidell has returned from Europe, where for several years he has represented the Gisholt Machine

WILLIAM G. MATHIAS

Co., Madison, Wis. He will be stationed at the Madison works for the present.

H. Resnick, who formerly was manager of the Pittsburgh office of Luria Bros. & Co., has assumed his new duties as general manager of Bialosky Bros. & Co., Cleveland, iron and steel scrap.

Edward L. Dunn, identified for 15 years with the engineering department of the Standard Plunger Elevator Co., Worcester, Mass., has been given a position in the ordnance department at Washington.

Frank Rhodes has become factory metallurgist of the Aurora, Ill., plant of the Independent Pneumatic Tool Co. For some time he has been in the pneumatic tool engineering department.

Clarence E. Whitney, president of the Whitney Mfg. Co., Hartford, Conn., was chairman at a conference of the New England Open Shop associations, held recently at Narragansett hotel, Providence, R. I.

Edward J. Cross, president and treasurer of the E. J. Cross Co., and president of the Norcross Bros. Co., both of Worcester, Mass., was recently elected president of that city's Rotary club.

Sidney J. Williams has resigned as chief engineer of the Industrial Commission of Wisconsin, Madison, to accept the position of safety engineer of the reorganized accident prevention department of the National Safety Bureau, Chicago.

Brig. Gen. Tracy C. Dickson of the ordnance department, has been assigned to the plant of the Bethlehem Steel Co., South Bethlehem, Pa., due to the growing importance of the work being done there for the government.

Paul H. Berggreen will be in charge of the St. Louis office in the Railway Exchange building, to be opened by the Brown Instrument Co., Philadelphia, for the sale of its pyrometers in the southwestern part of the country.

J. W. Weinland resigned recently as manager of the brake beam department sales of the American Steel Foundries to become Chicago district manager in the McCormick building for the Liberty Steel Products Co., New York.

Alba B. Johnson, president of the Baldwin Locomotive Works, has been elected president of the Railway Business association, to succeed George A. Post, of New York, who had been head of the association since its formation in 1908.

Charles B. Bohn, who recently resigned as manager of the Detroit plant of the Aluminum Castings Co., has organized the Charles B. Bohn Foundry Co., Hart avenue, Detroit. Brass, aluminum and bronze castings will be manufactured.

William C. Potter recently resigned his executive position in the various companies controlled by Guggenheim Bros., New York, of which firm he a member, in order that his entire time may be devoted to work on the aircraft production board.

Men of the Iron Trade

Personal News of a Business Character Regarding the Men of Affairs of the Industry

WILLIAM C. SPROUL, Chester, Pa., who has represented his county in the Pennsylvania state senate continuously through six successive terms, or since he was 25 years old, is a striking type of the business man of prominence in the political field. Mr. Sproul has been nominated for the the governor of Pennsylvania by the Republican party, which is equivalent to election. His business career has been characterized by great initiative and success. Prior to his first election as state senator, he was a newspaper man. A few months after being graduated from Swarthmore college, he bought an interest in the *Chester Times*. The success attending the publication of that daily newspaper has marked his other ventures. In 1900, he organized the Seaboard Steel Casting Co., Chester, Pa., of which he was president. Upon its amalgamation with the Penn works of the Penn Seaboard Steel Corp., he became director and member of the executive committee. At the same time he formed the Chester Shipping Co., and has since taken a deep interest in water transportation. West Virginia served as his next field of operation and he has been connected with street railway, electric power, bridge building, coal mining, lumbering, oil and gas enterprises in that state. With others in 1909, he organized the General Refractories Co., which is now one of the largest companies of its kind in the country. It has many plants in Pennsylvania, Kentucky, Illinois and Wisconsin. Mr. Sproul is president. He also holds a similar office with the Lebanon Valley Iron & Steel Co., Lebanon, Pa. One of his latest enterprises was the purchase in 1916 of the Robert Wetherill & Co. works in Chester, manufacturers of marine equipment. A few months after acquiring this property he turned it over to the Sun Shipbuilding Co., in which he retains a large interest as a member of the board of directors.

C. J. Ramsburg, vice president of the H. Koppers Co., and the Pittsburgh By-Product Coke Co., Pittsburgh, was recently made technical expert on toluol in the United States ordnance department to assist Col. C. W. Watson in increasing the supply of toluol.

Gust B. Erickson, formerly affiliated with the Duluth Brass Works and A. A. Williams, formerly of the Duluth Gas Engine Works, Duluth, Minn., have organized the Crescent Brass Foundry Co., Superior, Wis., to manufacture brass and bronze marine castings.

WILLIAM C. SPROUL

L. L. Newton has resigned as secretary of the Luther Grinder Mfg. Co., Milwaukee, to become secretary, treasurer and general manager of the Stegeman Motor Truck Co., 606 Linus street, that city. He remains a director of the Luther company for the time being.

J. E. Payne, 67 East Long street, Columbus, who is a steel construction expert, was recently made acting general manager of the Concrete Steel Fire Proofing Co., Detroit, in the place of S. V. Taylor, who is a captain in the heavy field artillery section of the army.

George Brown of the purchasing department of the National Tube Co., Pittsburgh, has been named purchasing agent for the new ordnance plant to be constructed on Neville island in the Ohio river, near Pittsburgh, for the government, by the United States Steel Corp.

Benjamin H. Ball succeeds Frank E. Marvin as New England representative of the Stanley Works, New Britain, Conn. He formerly was with the John E. Bassett Co., New Haven, Conn. Mr. Marvin has reported for service at Camp Upton, Yaphank, L. I.

John C. Brown, sales manager of the Lebanon Valley Iron & Steel Co., Philadelphia, was recently elected president of the Eastern Bar Iron institute at its annual meeting. O. H. Reinhart, secretary of the Milton Mfg. Co., Milton, Pa., was made vice president, and E. T. Edwards, Columbia, Pa., treasurer.

H. S. Patterson was recently made manager of the railroad department of the Walworth Mfg. Co., with headquarters at Boston, and H. T. Goodwin was made his assistant with headquarters at New York. Both obtained their training with the National Tube Co., by taking the specialty course at its Kewanee, Ill., works.

Russel Cowles, president of the Metals Trading Corp., New York, the Sandusky Foundry & Machine Co., the International Fabricating Co., Wilkesbarre, Pa., and vice president of the Ansonia Clock Co., and the Cyclops Steel Co., was tendered a testimonial dinner at Greenwich, Conn., May 22, by 50 of his friends.

George M. Verity, president of the American Rolling Mill Co., Middletown, O., was recently elected president of the committee in charge of camp welfare houses at Camp Sherman, O. James A. Campbell, president of the Youngstown Sheet & Tube Co., Youngstown, O., is likewise on the committee.

Eugene W. Lewis resigned recently as vice president and director of the Timken-Detroit Axle Co., Canton, O., to devote his entire time to work for the government. A. R. Demory, vice president, was elected vice president and general manager; Frederick C. Gilbert, secretary, was made vice president in charge of sales and advertising and C. W. Dickerson, treasurer, was elected secretary and treasurer.

Iron and Steel Men in War Machine

Jay C. McLauchlan, Chief of Pig Iron Division, War Industries Board

JAY CHANDLER McLAUCHLAN is not known officially as pig iron director of the war industries board. That however, virtually is what his functions in the war machine make him. Upon him the war administration depends for the pig iron supply of essential industry. If ships represent the one leg the government's war effort is standing upon, pig iron represents the other. The ship program mainly is a question of steel and without pig iron there could be no steel. As assistant to Director of Steel Supply J. Leonard Replogle, Mr. McLauchlan has charge of the pig iron division of the war industries board. His entire time is devoted to production matters, the routine work being left in the hands of his assistants. Statistical data showing production, shipments and orders are furnished weekly to the war industries board by every iron and steel plant in the country. Industry's requirements of steel are filed with Mr. Replogle and when he is asked to furnish a certain tonnage of steel, he in turn requests that the requisite tonnage of pig iron is provided for by Mr. McLauchlan. He is the Washington point of contact of the American Iron and Steel institute's committee on pig iron, iron ore and lake transportation. Through the committee are made the allocations of iron requested by Mr. McLauchlan on behalf of the government for various plants engaged in manufacturing war products.

Closely allied to pig iron is the country's coke production and through Mr. McLauchlan's efforts to co-ordinate the coke and railroad administrations, the latter now work harmoniously. As a result pig iron is being produced on a larger scale because the coke is being furnished and transported to the blast furnaces.

With the increasing governmental control over pig iron supplies and distribution, Mr. McLauchlan's duties and responsibilities promise to expand greatly. The statistical canvass of the pig iron industry now being made by the committee on pig iron, iron ore and lake transportation is to equip the government with the exact knowledge for what purposes every ton of iron is being made or consumed today. This is preliminary to a close direction of distribution of iron so that plants doing direct and indirect war work will have first call on supplies. Mr. McLauchlan will be the arm of the government in carrying out this system of supplying essential industry.

Mr. McLauchlan is a representative type of the younger generation of business men upon which the government is placing great dependence for the efficient handling of the industrial side of the war. His previous experience has given him a wide familiarity with the commercial side of the three great branches of the iron and steel industry, iron ore, pig iron and steel. For some years, he was a salesman for Pickands, Mather & Co., and then for the Jones & Laughlin Steel Co. Before going to Washington last year, he had been connected for eight years with the sales staff of the Lackawanna Steel Co., and last was serving as district sales manager of the company at Detroit. At present he is a member of the firm of Pickands, Mather & Co., Cleveland.

He was born in Cleveland March 12, 1874 and was graduated from Yale college with an A.B. degree.

JAY C. McLAUCHLAN

Iron and Steel Financial News

Up-to-the-Minute Fact and Comment Collected and Sifted For Busy Readers

Business Men Want War Tax Settled

SECRETARY of Treasury McAdoo has expressed the view that immediate action on new revenue legislation is necessary and the question is before President Wilson for decision. Many members of congress had urged that pressing business now on the calendar be disposed of, that congress be adjourned and then come back for a special revenue session in the fall. However, business men generally will be better pleased to have the policy settled now so that the country will not have hanging over it the prospect of immensely increased but still undetermined levies on incomes and excess profits. The time taken in discussing the taxes for this year, and hasty decision adopted at the eleventh hour, last autumn, prevented corporation tax payers from calculating the taxes on their current profits and made for much unsettlement. This is at least one phase of the tax question which can be omitted for the coming year, it is felt, to the benefit of the business community.

Chairman Kitchin of the house ways and means committee announced that a bill practically doubling present taxes of around $4,000,000,000 would be presented, with the burden placed largely on incomes and excess profits. Representative Garner of the house committee estimates that the war expense for the next fiscal year will be $24,000,000,000, of which one-third or $8,000,000,000 will come from taxes and the remaining two-thirds from loans.

Appropriations Greatly Enlarged

The government plans to increase largely its war activities. The army alone is asking for appropriations equal to the amount actually spent this year by all departments of the government. This year the government actually expended only $7,000,000,000 in war work, aside from $5,000,000,000 loaned to the allies. Of this total expenditure, $3,500,000,000 is expected to be raised by the excess profits and income taxes, or approximately 50 per cent of the whole cost. Obviously it will be impossible to raise 50 per cent of the next fiscal year's expenditures, or $12,000,000,000, although there are some people at Washington who still believe half of war expense should be so raised.

Deny Leaseholders Right to Depletion Charge

Owners of leaseholds on iron ore properties may not be allowed any deductions for depletion of their holdings in determining taxable profits. The United States Supreme court has just approved this ruling in its decision in the Biwabik Mining Co. case.

Ore mine operators, whether leaseholders or fee owners, had not been accustomed until recently to charge depletion against shipments from their mines. Increased costs and taxes, however, have led to the wider appreciation of the importance of such charges. The Biwabik case has been followed with great interest as a test of the rights of the lease holder to make such deductions. No question has arisen over the rights of the fee-owners to make deductions for depletion of their ore properties.

Westinghouse Shows Good Year and Prospects

In the report to stockholders of the Westinghouse Electric & Mfg. Co., the board of directors states that sales billed in the fiscal year ended March 31, 1918, aggregated $95,735,406, compared with $89,539,442 the preceding year. This represents the entire business except that of the New England Westinghouse Co., and includes shipments since June 15, 1917, from the Machine Works, formerly the Westinghouse Machine Co., as well as $4,536,000 in munitions. The volume of sales billed for the regular products of the company was greatly in excess of any previous year. Unfilled orders, April 1, 1918, totaled $147,857,580 as compared with $39,776,739 at the close of the previous year, which nearly doubled the previous record. Of this total, $110,185,007 represents calls for regular products. No facilities heretofore used in the production of regular lines now are devoted to war work. Net income of $15,405,680 compares with $18,079,889 as of March 31, 1917, and the 1918 earnings are equivalent to 21.36 per cent on the common stock, against 25.13 per cent. This is after all charges are deducted including income and excess profits taxes. After the payment of $5,610,848 in dividends, the surplus, March 31, was $26,101,691, and increase of $8,239,390. The comparative income account follows:

	1918	1917
Sales billed	$95,735,406	$89,539,442
Cost of sales.....	80,225,936	72,077,752
Net mfg. profit....	$15,509,469	$17,461,690
Other income:		
Int. and disct.....	308,834	298,086
Divs. and int.....	903,559	1,027,808
Misc., royalties, etc..	112,869	60,652
Gross income	$16,834,733	$18,848,237
Deduc. from income:		
Int. on bonds & deb.	303,916	89,333
Int. on notes payable	1,108,046	529,115
Misc. interest	17,089	149,900
Net income	$15,405,680	$18,079,889

The report shows the transfer of title from the Westinghouse company to a British syndicate of the stock of the British Westinghouse Electric & Mfg. Co., Ltd., in exchange for which the American company received 10-year debenture bonds, secured by the deposit of the stock transferred and other collateral. The former British subsidiary, now called Electric Holdings, Ltd., has made a trade agreement to represent the American company in England.

Notes retired during the year leave outstanding but $52,500 of the issue of 1909. Because of the heavy inventory carried, the company increased its notes payable by $12,000,000, the total outstanding now being $30,186,051. This includes $15,000,000 one-year notes and $2,433,551 on account of Liberty loan bonds subscribed for by employes.

The loss of $5,000,000 on the Rus-

sian rifle contract the previous year was written off the books by the conversion of reserves.

March Earnings Are High

Official figures recently made available show $617,000 were the net earnings of the Allis-Chalmers Mfg. Co., Milwaukee, for March, after allowing $200,000 for war taxes. This is equivalent to 21 per cent on the common stock after deducting 7 per cent preferred dividends and extras at the rate of one-fourth of 1 per cent at each quarter. The statement is made that the practice of paying off accrued dividends at three-fourths of 1 per cent will be continued and it is expected that by Dec. 31, 1919, these will have been paid off. Estimates of May shipments place the figure at $3,000,000, or at the rate of $36,000,000 worth of goods per year.

Huge Sums Stay in U. S.

With comparatively few exceptions, all monies advanced to the allies of the United States since the war began by the latter nation, have been spent in this country. The treasury simply places the money advanced in bank as the credits are called upon, but has assurance that all of it is expended here for foodstuffs and munitions. The credits advanced to the allies to date aggregate $5,766,850,000. This includes $325,000,000 advanced Russia, $191,000,000 of which still stands to her credit. Obligations of foreign governments purchased to date aggregate $5,279,750,000, which leaves the excess of loans $487,100,000 less Russia's $191,000,000, making the net $296,100,000, which represents credits advanced but as yet unexpended.

Certificates Participate

In a statement to stockholders, issued after a recent meeting of the board of directors of the Gulf States Steel Co., Birmingham, it was developed that $272,524 was the net income for April. The usual quarterly dividend of 2½ per cent on the common stock was declared, payable July 1 to stockholders of record June 15. The statement follows in part:

"This dividend will also apply to the common stock trust certificates, which will be issued to represent the 25 per cent stock distribution to be made on June 3. Authority to list such common stock trust certificates has been granted by the New York stock exchange. There was formerly $4,000,000 of second preferred stock outstanding; all but $152,100 has been converted into common stock, which will make the total outstanding common stock as of June 3, $1,097,900, in addition to the $2,000,000 first preferred stock.

Toluol Price

For Outside Use to be Fixed—Benzol Makers Reduce

New York, May 25.—The toluol division of the war industries board has become impatient with what it regards as profiteering by some of the smaller makers of toluol, and accordingly is preparing to fix a uniform price on all toluol released for commercial consumption. Although it is not yet certain what this price will be, it is intimated that it will not be far from $1.50 per gallon at producers' plants. This is the price that the government is paying for its toluol. It is expected that the price will be fixed to apply to releases at the end of May for June delivery.

A material reduction in benzol prices has developed during the past few days. One large producer came out with general offers of large quantities at 27 cents per gallon and other makers have followed suit. It is probable that even this figure now may be shaded on attractive lots. The market on pure benzol may be quoted at 27 to 30 cents per gallon depending upon quantity.

No action has been taken by the navy department on its recent inquiry for solvent naphtha. The product is moving slowly but the market continues firm at 18 to 22 cents per gallon for contract and at 18 to 25 cents for spot shipment.

Due to the larger output during the past couple of months, producers of phenol are well up on deliveries and have fairly large stocks. The market may be quoted at 48 to 52 cents per pound, depending on quantity. Practically no naphthalin is being sold, due to the urgent call for deliveries on contracts. Occasional small spot lots are being sold at 10 to 12 cents per pound.

The government now is expected to take practically the entire output of sulphate of ammonia over the next two or three months. With the exception of occasional spot carloads, which are going at $5.65 to $5.75 per 100 pounds at seaboard, no commercial business is being booked. The government has requested producers not to make at future commitments.

Coke Oven By-Products

	Spot
Per Gallon at Producers Plant	
Pure benzol	$0.27 to .30
Toluol (on sales sanctioned by government)	1.75 to 2.00
Solvent naphtha	.18 to .25
Per Pound at Producers Plant	
Phenol	$0.48 to .52
Naphthalin (nominal)	.10 to .12
Per 100 Pounds at Seaboard	
Sulphate of ammonia	$5.65 to 5.75
Contract	
Pure benzol	$0.27 to .30
Toluol	no market
Solvent naphtha	.18 to .22
Per Pound at Producers Plant	
Phenol nominal.	
Per 100 Pounds at Seaboard	
Sulphate of ammonia	nominal

To Hold Foreign Exhibit

An organization, of which Alfred I. du Pont of Wilmington, Del., is one of the stockholders, has purchased the lease-hold of the grand Central Palace, New York, with a floor space of more than 500,000 square feet, and will make alterations to suit the building for a colossal exhibit of the manufactured goods of foreign countries. Incidentally, the products to be exhibited may be received in this country without payment of duty, and in fact no duty must be paid on them until they are sold. Unsold goods will be returned to their point of origin. The new organization has secured this privilege by taking over the lease of the Merchants' and Manufacturers' exchange of New York. Agents have already been sent to Europe to arrange for the shipment of European products. It is believed sufficient space will be available on returning vessels to enable the organization to maintain a complete exhibit without waiting for the conclusion of the war.

Among Mr. du Pont's associates are: William du Pont of Delaware and Virginia; Charles C. Dickson, Wilmington; William P. Bonbright, New York; ex-Governor Myron T. Herrick, Ohio; Viscount Furness of Furness Withy & Co., London; General Sir John Carson, Montreal; Col. William Cantley, Nova Scotia; Judge S. G. Archibald and M. Etienne Groschlaude, Paris.

The Morgan Spring Co., Worcester, Mass., has taken over the Miller Wire Cloth Co., 72 Commercial street, in that city, and will continue to operate it as a branch. The company is a Massachusetts corporation, capitalized at $20,000, of which Morton M. Miller is the president and treasurer. It has been in business but a few years.

Shipyards and Railroads Buy Tools

Steady Activity in Machinery Market is Furnished by Munitions Manufacturers, Railroads and Shipbuilding Plants—Tool Requirements of the Ordnance Department Are Still in Suspense

NO BUYING of equipment yet has developed in connection with the new government ordnance plants. The class of equipment needed will no doubt be furnished largely from the east, with possibly some part from the Chicago district, due to the fact that these localities have previously handled the bulk of the heavier machinery business. Shipbuilding still expands and supplies a steady source of machine tool inquiries. The most recent large venture contemplated in this connection is two yards, the sites for which have not yet been chosen. They will be built by the Bethlehem Shipbuilding Corp., Bethlehem, Pa. Other new yards are under consideration, and resultant machine and crane demand is expected. Crane inquiries in general have been large. The government is a consistent purchaser, and is now in the market for a large number of cranes for interior shops. An interesting phase of new war business is furnished by a large order for gray iron grenades, which has been distributed among a number of Chicago manufacturers. Machine tools for finishing operations are now being inquired for by the shops taking these contracts. The International Harvester Co. is purchasing equipment for extensive plant additions. The railroads are following their usual custom of issuing specifications and requests for bids through their individual purchasing agents, specifying each machine by dimensions and in most cases giving the name of the manufacturer whose machine will form the first choice in alloting the contract. As was expected the lists this year are larger, and represent replacements which in most cases are long past due. Greater promptness is promised in placing contracts this year, and also in providing payment for equipment purchased as the need for promptness is appreciated. It is expected that fair deliveries can be secured on most machines needed by the railroads, as the class of tools varies widely from that needed in most war industries. The navy department will buy a large number of tools soon.

Inquiries for Cranes Strike Upward Trend

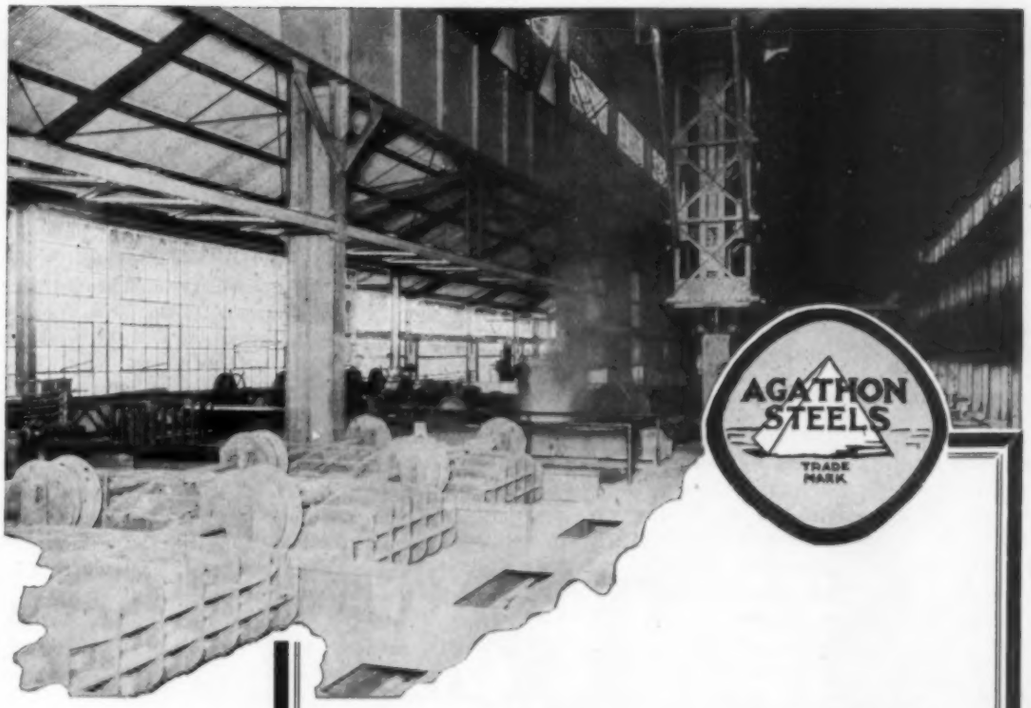
ALTHOUGH business of tremendous proportions is expected to set in shortly, trading in the eastern machine tool market during the past week has been confined chiefly to small, miscellaneous inquiry. This demand, however, due to increasing speed and additional equipment required in the operation of plants generally, has aggregated a good volume. The railroads continue to come into the market on a steadily increasing scale, picking up odd lots of tools here and there. The Delaware, Lackawanna & Western has covered recently on a number of tools in this way. The Pennsylvania Lines West and the New York, New Haven & Hartford also are now closing on equipment. The New York Central has started buying, although not as yet on a large scale. The Chicago, Burlington & Quincy has virtually covered on its recent list and the Erie railroad has closed on most of its present requirements.

The announcement that the Bethlehem Shipbuilding Corp. will erect two large yards, one in the east and the other along the Pacific coast, has been the outstanding development in the shipbuilding industry during the past week. The exact locations of these plants has not as yet been stated. Inquiries already have been put out for 225 to 250 cranes by the Bethlehem corporation. Considerable interest also is being manifested in reports that a $1,000,000 shipyard will be erected on property at Greenpoint, L. I., which has just been transferred to the Greenpoint Improvement Co. The Federal Shipbuilding Co., 54 Dey street, New York, has just added 20 acres more to its holdings in Newark meadows, N. J., for further plant expansion. Among shipbuilding companies to close on machinery equipment during the past few days are the Foundation Co., the Carolina Shipbuilding Co., both of New York City, and the New York Shipbuilding Co., Camden, N. J. The Standard Oil Co. of New York has closed on a considerable amount of equipment for the tank shop at its new plant in Providence, R. I.

The Butterworth-Judson Co., New York, will build a $7,000,000 picric acid plant at Brunswick, Ga., for the government, the contract having been just completed. The Bay Ridge Dock Co. will erect a large repair shop at its yard in Brooklyn. The Lake Torpedo Co. will be in the market shortly for equipment for its new machine shop addition at Bridgeport, Conn. Work will be started soon on a $500,000 addition to the plant of the Gillette Safety Razor Co., in South Boston. Bids are being received on a large extension by the Northway Motor Corp., Natick, Mass.

Crane Market Shows Activity

The crane market is the most active in months. The largest inquiry out is that of the Bethlehem Shipbuilding Corp., calling for 150 to 200 overhead cranes of various capacities, and 40 locomotive cranes, of which 30 are to be of 15 tons capacity each and 10 of 20 tons capacity. The New York Shipbuilding Co., Camden, N. J., has issued a new inquiry for 20 electric cranes. Specifications call for gantry and standard overhead cranes ranging from 10 to 50 tons. Another large inquiry, that of the government calling for eight 10-ton, 50-foot span; seven 10-ton, 70-foot; two 20-ton, 50 foot, and one 50-ton, 50-foot traveler. These cranes will be for distribution among interior plants. The Phelps-Dodge Corp., 99 John street, New York City, is inquiring for seven electric cranes, including three of 20 tons, two of 2 tons, one of 5 tons and one of 60 tons capacity. The



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Agathon Alloys are one-purpose steels. That is, they're made with the service they are to give constantly in mind.

That assures you that **your** order will be just as you would have it.

Like a tool that's built for the job, Agathon made-for-the-work steels will serve your purpose best.

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Chrome Steel

"AGATHON"
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The Central Steel Co.

Massillon, Ohio

Sales Offices

Detroit Office: 326-27-28 Ford Bldg. F. Walter Guibert, District Representative.

Cleveland Office: Hickox Building. The Hamill-Hickox Company, District Representatives

Chicago Office: 1370 People's Gas Bldg., 122 S. Michigan Blvd. C. H. Beach, District Representative.

Philadelphia Office: 603 Widener Bldg. Frank Wallace, District Sales Manager.

Syracuse Office: 621 University Blk. T. B. Davies, District Sales Manager.

J. E. Dockendorff & Co., 20 Broad St., New York, General Export Agents.

AGATHON
ALLOY STEELS

Crucible Steel Co. is in the market for a 5-ton bucket crane for its plant at Harrison, N. J. The Pennsylvania railroad is inquiring for a 3-ton bucket crane. The New Britain Machine Co., New Britain, Conn., has dropped its inquiry for a 10-ton crane, but remains in the market for a 5-ton crane. The William Cramp & Sons Ship & Engine Building Co., reported in last week's issue as having placed four cranes, has awarded this business to the Champion Engineering Co., Kenton, O. These cranes are to be of 15 tons capacity, 112-foot span. The Merchant Shipbuilding Co., Bristol, Pa., has also placed four cranes with the Champion company. Specifications call for three gantry cranes of 10 tons capacity and one gantry of 15 tons capacity, all with 85-foot span.

Grenades Cause Brisk Chicago Market

ACTIVITY continues in the machine tool market in Chicago, with business coming in small inquiries from miscellaneous sources. The inquiry for large lots, while not entirely absent, is much less than was the case earlier in the year. Some dealers find that April set a new record for the total business booked, and May promises at least to equal that month. Railroads which have been inquiring for tools have covered for as much as they intend to buy at present and they are not now in the market. Contracts for the manufacture of gray iron hand grenades are being placed and considerable inquiry for miscellaneous light tools is resulting. It is reported contracts for 100,000,000 hand grenades out of a total of 250,000,000 are about to be placed by the government. The International Harvester Co. has bought 40 lathes and 15 two-spindle drill presses, as well as some general machine shop equipment. Another interest which will undertake the manufacture of grenades has bought 38 lathes and a number of drill presses. It is expected that once manufacture is successfully under way the government will double its contracts and necessitate considerable more equipment. Advances are being made regularly and 10 per cent is the usual amount by which prices are increased. Some dealers find it increasingly difficult to get tools and attribute this to the fact that builders are not able to obtain their material as readily as formerly, as well as the fact that distribution of tools is under closer control by the government than formerly and much machinery is commandeered and sent where it appears to be of more immediate importance. The Bunting Boiler Co., Chicago, will build a boiler shop. The Riverside Iron Works, Chicago, will build a foundry. The Evansville Tool Co. will build a power house at Maryland, Ind. The De Pere Mfg. Co., De Pere, Wis., will build additions to its main shop and blacksmith department. The Universal Machinery Co., Milwaukee, will build a machine shop group.

Steady Business Holds in Cleveland District

WITH a few exceptions, buying in the Cleveland district continues to be featured by single tool and small lot contracts. The New York Central has issued a list of between 30 and 40 machines for their shops at Collinwood, O., Gibson, Kankakee and Englewood, Ill. The tools required cover milling machines, grinders, boring mills, lathes and shapers. It is understood that the list at present in the market is to be followed by another and larger number of requirements within a few weeks. The Grant Motor Car Co., Cleveland, which has been making equipment for the ordnance department in connection with an established automobile plant has purchased over $135,000 worth of shell-making machinery to handle a large shell contract. Part of the equipment goes to their plant at Findlay, O. The automobile plants in Detroit furnish a steady source of business in that locality. Dealers receive inquiries daily from these companies, and frequently plant representatives from Detroit are sent out to pick up desired equipment. Motors, some classes of drilling machines and lathes, and cutting-off machines have advanced about 10 per cent, while on some classes of equipment an even greater increase is announced. The Dann Products Co., Cleveland, is inquiring for a screw-slotting machine. The Tractor Parts Co., Cleveland, has been organized by J. O. Eaton, of the Torbenson Axle Co., and will build a plant in the near future. The Maxwell Motor Car Co., Detroit, is inquiring for heavy-duty drilling machines and a slab miller. The National Lamp Works, Cleveland, has issued a list which includes the following tools: One 10-foot vertical boring mill or a 6-foot vertical boring mill which can be extended; two No. 4 horizontal milling machines; two No. 2 Becker vertical milling machines; two No. 5 vertical milling machines; one 2¾-inch spindle Lucas horizontal boring mill; one 40-inch by 18-foot lathe; and one No. 8 Warner & Swasey turret screw machine.

New Construction and Equipment

Concise and Timely Business Building Opportunities from the Field of Industry

Among New England Factories

MILFORD, N. H.—The Milford Mfg. Co. will build a new weave shed, 50 x 130 feet, 3-story, of brick construction. Enlargement of the engine room also is planned.

SOMERSWORTH, N. H.—The Great Falls Woolen Co. will build a 4-story and basement, 100 x 76-foot, storehouse.

BILLERICA, MASS.—The Boston & Maine railroad is to lease its shops to the General Electric Co. and will make additions to its repair shop and roundhouse in Concord, N. H.

BOSTON.—Plans have been completed for a brick, stone and terra cotta, fireproof, 5-story and basement, 160 x 209-foot immigration station to cost $250,000 for the government on Marginal street, East Boston, Mass.

CAMBRIDGE, MASS.—The American Rubber Co. is having a factory building erected on Potter street, which will be 105 x 47 feet, of brick, steel and glass, and cost $24,000. The Cambridge Rubber Co. is constructing a 2-story brick building for factory purposes at 748 Main street to cost $10,000.

LAWRENCE, MASS.—The United States Worsted Co. is to erect a steel boiler house to cost $25,000.

MALDEN, MASS.—The Converse Rubber Co. will build a brick and concrete, 2-story

CHESTER PENNSYLVANIA

WAR CHEST

DELAWARE RIVER STEEL CO.

"DELAWARE"

addition to its plant at 379 Pearl street, Edgeworth.

METHUEN, MASS. — The Arcadia Mills has started the foundation to a 3-story oil storage building, 19 x 40 feet, to cost $20,000. An additional story is to be added to one of the company's buildings, 50 x 300 feet, to cost $20,000.

PITTSFIELD, MASS.—J. McArthur Vance is receiving bids on a 4-story, 20 x 104-foot warehouse addition for W. G. Norton.

THORNDIKE, MASS. — The Thorndik Co. will build a reinforced concrete, steel and brick, mill construction, 4-story, 132 x 325-foot weave shed, to cost $350,000, and a 5-story, 75 x 195-foot storehouse to cost $150,000. C. W. Praray, New Bedford, Mass., is architect.

PAWTUCKET, R. I.—D. Goff & Sons have let the contract for a brick, steel and reinforced concrete, fireproof, 3-story, 350 x 120-foot building on Main, River and Elm streets, to be used as a weave shed, storage and garage.

PEACEDALE, R. I.—The Rocky Brook Mills Co., recently incorporated with $250,000 capital by South Kingston, R. I., men, has let the contract for a mill construction, 1-story, 46 x 116-foot weave shed; 1-story, 52 x 46-foot picker house; 1-story, 45 x 60-foot dyehouse; 1-story, 30 x 51-foot boiler house, and for remodeling the present 3-story, 42 x 112-foot mill.

WOONSOCKET, R. I.—Arthur L. Garland will build a 2-story, 70 x 125-foot warehouse. C. M. Godfrey is the architect.

WOONSOCKET, R. I.—The Glenark Worsted Co. will build a 1-story, 58 x 196-foot addition to its 2-story mill.

BRIDGEPORT, CONN.—Harvey Hubbell, Inc., will build a brick and steel, 1-story building on Railroad avenue.

BRIDGEPORT, CONN.—The American Can Co. will build a brick, 1-story addition to its plant on Holister avenue.

BRISTOL, CONN.—Plans are being made for a brick, mill construction, 1-story, 32 x 45-foot and two 4-story, 35 x 60-foot and 45 x 120-foot factory buildings for the Dunbar Bros. Co.

DANIELSON, CONN.—The Goodyear Cotton Mills, Inc., will build a brick power house to cost $150,000, which will be equipped with steam turbine engines.

DANIELSON, CONN.—The Goodyear Cotton Mills, Inc., will build a brick power house, equipped with steam turbine engines, to cost approximately $150,000.

HARTFORD, CONN.—The Allied Tobacco Co., recently incorporated for $500,000, will build a brick, 1-story, 100 x 200-foot warehouse, to cost $40,000, and a boiler house with a 50-foot stack on Windsor street.

HARTFORD, CONN.—The Jewell Belting Co. has sold its property and acquired a new factory site near Charter Oak Park where a new plant will be built.

KILLINGLY, CONN. — The Assawaga Woolen Co. is planning to build a brick addition to its plant, 94 x 194-feet, 1-story.

NEW BRITAIN, CONN.—Plans have been completed for the construction of a brick and steel, 100 x 340-foot building for the New Britain Machine Co. F. G. Platt is president of the company.

STAMFORD, CONN.—Bauer Bros. have started work on two factory buildings, one two stories, 60 x 80 feet, and the other three stories, 30 x 100 feet.

Along the Middle Atlantic Seaboard

BROOKLYN, N. Y.—Alterations costing $20,000 will be made to the plant of the Decorative Metals Co., 196 Degraw street. The H. D. Best Co., 52 Vanderbilt street, New York, is in charge.

BROOKLYN.—A $200,000 warehouse will be erected by the League Storage Warehouse Co., Inc. Cantor & Dorffan, 373 Fulton street, New York, are architects in charge.

BROOKLYN, N. Y.—The Long Island Railroad Co. will build a $15,000 repair shop, one story, 38 x 102 feet.

BUFFALO.—An electric power plant will be constructed by the Buffalo Cereal Co. in connection with its new elevator, to be erected here at a cost of $300,000.

BUFFALO.—The Acme Steel & Malleable Co., 120 Chandler street, contemplates erecting a 1-story steel and brick foundry to cost $25,000.

BUFFALO.—The Bossard Co., Utica, N. Y., will build a 2-story factory, 63 x 116 feet, costing $30,000.

BUFFALO.—The Spencer Lens Co., this city, will build a 2-story addition 60 x 150 feet.

BUFFALO.—The Kurtzman Plane Co., 526 Niagara street, will build a 3-story addition to its plant.

BUFFALO.—Plans are being prepared for a foundry to be built by the Demarest Heating Corp.

BUFFALO.—The Buffalo Wash Tread Co. has bought a site on Tonawanda street for a plant.

ELMIRA, N. Y.—Bids are being taken for the erection of an addition to the plant of the LaFrance Motor Truck Co.

FREEPORT, L. I., N. Y.—The Testile Piston Ring Co., Inc., is drawing plans for a $14,000 factory building. E. C. Kern is architect.

FULTON, N. Y.—The Fulton Steel Corp. has had plans prepared for the erection of an addition.

LOCKPORT, N. Y.—Architects Lewis & Mill, Buffalo, are taking bids on a 1-story factory building, to be erected in this city.

NEW YORK.—The Standard Shipbuilding Co. is contemplating erection of a 1-story boiler shop, 60 x 400 feet.

NEW YORK.—The Clark Electric & Mfg. Co. is planning the erection of a 1-story addition 35 x 45 feet.

ROCHESTER, N. Y.—The Cochran-Bly Co. is contemplating the erection of a 1-story addition to its plant, 48 x 70 feet.

SCHENECTADY, N. Y. — The General Electric Co. has awarded the general contract for an addition to its drop forge plant to the Austin Co., Cleveland.

SCHENECTADY, N. Y.—Plans are made for the erection of a 1-story addition to the boiler shop of the American Locomotive Co.

TARRYTOWN, N. Y.—The Chevrolet Motor Co. will erect a 3-story, 60 x 150-foot plant addition.

UTICA, N. Y.—Plans have been completed for a 2-story, 111 x 130-foot storehouse for the Augusta Knitting Co.

UTICA, N. Y.—Plans are being drawn for a 3-story, 70 x 300-foot addition to the Globe Woolen Mills.

AMBRIDGE, PA. — The Parker Woolen Mills, Second National Bank building, let a contract to Kemens and Ehrheart, Eleventh and Melrose streets, for a $250,000 addition to its plant.

ASHMORE, PA.—The Lehigh Valley railroad is arranging to build shops and a round house to cost $1,200,000. G. T. Hand, 143 Liverty street, New York, is engineer.

CARNEGIE, PA.—The McClintic-Marshall Construction Co., Oliver building, Pittsburgh, has a contract for a $250,000 storage house here for Hughes-Foulkrod Co., Commonwealth building, Philadelphia.

CHESTER, PA.—John A. Worrell, 905 West Eighth street, has arranged to build a 1-story foundry at Eighth and Springwell streets.

EASTON, PA.—The Pennsylvania Utilities Co. is constructing a turbine plant here.

ERIE, PA.—The Burke Electric Co., this city, has leased 10 acres and will build additions to its plant.

ERIE, PA.—The Bay State Iron Works, this city, proposes to build a $20,000 plant near here soon.

HANOVER, PA. — The Hanover Wire

Government Inquiries

Bids on the following equipment are desired by the navy department, bureau of supplies and accounts:

Forty-one engine lathes, 4451½, June 14, Washington.

Eleven milling machines, 6 turret lathes, 18 screw machines, 6 grinding machines, 2 engine lathes, 4 drilling machines, and 4 chucking machines, 4454½, June 11, Washington.

Twenty-five engine lathes, 4469½, June 14, Washington.

Sand blast equipment, 4470½, June 11, Norfolk.

Boring and slotting machines, planers, etc., 4477½, June 14, Washington.

Shapers, screw and milling machines, and lathes, 4478½, June 14, Washington.

One lathe, 4556½, June 3, Washington.

Schedule numbers, dates of opening and places of delivery follow the specifications of the tools.

OHIO

Quality PLUS Service

STEEL CASTINGS

The whirring of the airplane—the roaring of the fast express—the thundering chug of the rapidly approaching motor truck, all *proclaim the victory of Ohio Steel Castings over "Power"* by proving the ability of these castings to withstand the terrific, racking, straining shocks of the mightiest engines constructed by man.

If you are in need of Tractor, Motor Truck, Automobile or other small castings—castings of a quality and strength fit for the most strenuous service specify *Ohio Steel Castings.*

Let us figure on your requirements.

The Ohio Steel Foundry Co.

Plants

Springfield, Ohio Lima, Ohio Bucyrus, Ohio

Cloth Co. is having plans prepared for a 1-story addition, 100 x 150 feet.

HYDE, PA.—The Nickel Alloys Co., this city, will build a 1-story addition, 140 x 240 feet.

MANHEIM, PA.—The Dun Foundry & Machine Co. will build a 2-story pattern shop, 25 x 150 feet, to cost $10,000.

MANHEIM, PA.—The Hershey Foundry & Machine Co. will build a 2-story foundry and pattern shop, 110 x 200 feet.

PERKASIE, PA.—The Perkasie Forge & Machine Co. will rebuild its plant here at once.

PHILADELPHIA.—Beatty & Bros., general contractors, are soon to start work on a $30,000 factory building, one story, 63 x 200 feet. Name of the owner is withheld.

PHILADELPHIA. — A $25,000 factory building will be erected by the Wiaco Screw & Machine Works. The Barclay White Co. has been awarded the general contract.

PHILADELPHIA.—A 72 x 100-foot foundry addition for the Aetna Foundry will be erected by A. Raymond Raff, general contractor.

PHILADELPHIA. — The Cresson Morris Co. has awarded the general contract for a $35,000 foundry to the Raith Construction Co.

PITTSBURGH. — The Pittsburgh Truck Wheel Corp., capitalized at $4,000,000, has been organized by A. L. Schulz, and Robert W. Barbour, chamber of commerce, Pittsburgh, and others, and proposes to build a plant here to manufacture steel truck wheels.

PITTSBURGH.—W. E. Moore & Co., Union Bank building, have plans for a plant, 60 x 200 and 40 x 120 feet, for the Gas Tank Recharging Co., Keokuk, Iowa, and have let the contract to the Worden-Allen Co., Chicago.

PITTSBURGH. — The South Pittsburgh Water Co., 238 Brownsville road, let a contract to Walker & Curley Co., East End Savings & Trust building, for a 1-story addition 48 x 118 feet to its power plant.

PITTSBURGH.—E. R. Crawford, president of the McKeesport Tin Plate Co., has announced that plans are complete for the erection of a new steam power plant, which is to be built at a cost of $1,200,000.

PITTSBURGH.—The Atlantic Refining Co., chamber of commerce building, has arranged to build a $50,000 plant at Fifty-seventh and Tulip streets.

PITTSBURGH.—The Heppenstal Forge & Knife Co. has arranged to build a $25,000 plant on Forty-sixth street.

PITTSTON, PA.—The Vulcan Iron Works, Wilkes-Barre, Pa., has let the contract for a 1-story machine shop, 75 x 200 feet, at West Pittston, to cost $500,000.

POTTSVILLE, PA. — The Atlas Powder Co., this place, will build an ammunition plant at Tamaqua, Pa.

READING, PA.—Daniel H. Hunter has received the general contract for erecting a $20,000 foundry, one story, 138 x 147 feet, for the Carpenter Steel Co. Muhlenberg Bros., architects, have drawn the plans.

WILLIAMSPORT, PA.—The Edison Electric Co., this city, will build a $75,000 addition to its plant.

WRIGHTSVILLE, PA.—The Pennsylvania Power Co. proposes to build a dam and another power plant at Turkey Hill, Pa.

YORK, PA.—The Brooks Machine Co., this city, has purchased a site at Broad and Philadelphia streets, and will erect a 1-story brick structure.

BAYONNE, N. J.—The Bergon Point Iron Works has had plans prepared for the erection of a 1-story addition to its plant. A new crane runway will be constructed. Improvements will cost about $8000.

BAYONNE, N. J.—The Standard Oil Co. of New Jersey, 26 Broadway, New York, will build a metal storage building at its plant in this city. Plans call for a structure one story, 80 x 140 feet.

HOBOKEN, N. J.—The Remington Arms & Ammunition Co. has awarded to the Austin Co., Cleveland, the general contract for erecting a $30,000 factory building here. The proposed structure will be one story, 82 x 108 feet.

JERSEY CITY, N. J.—The Federal Shipbuilding Co. recently purchased 21 acres on the west bank of the Hackensack river, and plans to erect additional buildings to its plant on it.

JERSEY CITY, N. J.—The Moran Iron Works has bought additional property adjoining its plant and contemplates an addition.

NEW BRUNSWICK, N. J.—Johnson & Johnson will build a $10,000 storage building.

NEWARK, N. J.—Maas & Waldstein will erect two factory buildings, one story, 55 x 25 feet and 55 x 128 feet, to cost $65,000. Henry M. Doremus & Co. have the contract.

NEWARK, N. J.—The general contract for an $18,000 foundry has been awarded by C. A. Goldschmidt to Joseph Christenson, Orange, New Jersey.

NEWARK, N. J.—The Central Stamping Co. will erect a 1-story, brick, enameling building, 140 x 250 feet, to cost $50,000.

NEWARK, N. J.—The Orance Mfg. Co. will build an addition and erect a garage, to cost $10,500.

NEWARK, N. J.—Bids soon will be received by the Sanders Mfg. Co. on a $12,000 plant addition.

NEWARK, N. J. — The Gray Industrial Laboratory Co. will erect a 1-story, brick building to cost $12,236.

NEWARK, N. J.—Central Stamping, 605 Ferry street, will erect a factory to cost $50,000.

Business Changes

HARPER & SON, New York, manufacturers' representatives of iron and steel products have removed their offices to the 18th floor of the Barclay building, 299 Broadway.

The Inland Steel Castings Co., Terre Haute, Ind., has changed its name to the Inland Malleable Iron & Steel Co.

The Brown Instrument Co., Philadelphia, has opened an office at 2086 Railway Exchange building, St. Louis. Paul H. Berggreen is in charge.

Crocker Bros., manufacturers and merchants of pig iron, coke, etc., have removed their offices from 30 East Forty-second street to 21 East Fortieth street, New York.

John Parker, eastern representative for the Milwaukee Electric Crane & Mfg. Co., has moved his offices from the fifth to the eighteenth floor at 50 Church street, New York City.

The Paul Wenger Co., New York, dealer in copper, aluminum, tin, lead and other metals, has removed to larger quarters and now is located at 56 to 58 Liberty street and 35 Nassau street.

Activities in the Central States

EAU CLAIRE, WIS. — The foundry of the United States Switch Co. is being enlarged. Officers state a large warehouse will be erected soon. The company is seeking milling machines, turret lathes, a bolt cutter and some forging equipment. An electric furnace is to be installed. A drop forge plant also is planned. James W. Hubbard is president and general manager.

EXCELSIOR, WIS.—Richland county is planning the erection of a bridge to cost $45,000. M. W. Torkelson, Capitol building, Madison, is state bridge engineer.

GREEN BAY, WIS.—D. G. Meyer, South Adams street, will build a 2-story fireproof addition, 20 x 60 feet, to the rear of his garage to provide larger machine shop facilities.

HARTFORD, WIS.—The Kissel Motor Car Co. is building two additions, 40 x 100 feet, and 40 x 200 feet, costing $40,000.

LODI, WIS.—Isenberg Bros., Baraboo, Wis., have taken the contract for erecting a new high school costing $50,000, for Lodi, Columbia county.

MANITOWOC, WIS.—Bids will be taken shortly by Capt. Lewis N. Stoddard, lighthouse inspector, government building, Milwaukee, for construction of steel signal and light tower on the breakwater in Manitowoc harbor. The tower will have a steel frame, and be sheathed with steel plates. The work will cost about $20,000.

MENOMONEE, WIS.—The Ampco Rolling Mill Corp. will build a wire mill costing $40,000. American Industrial Engineering Co., 53 West Jackson boulevard, Chicago, is engineer.

MENOMONEE FALLS, WIS. — The Schumann Motor Co. is preparing to build a

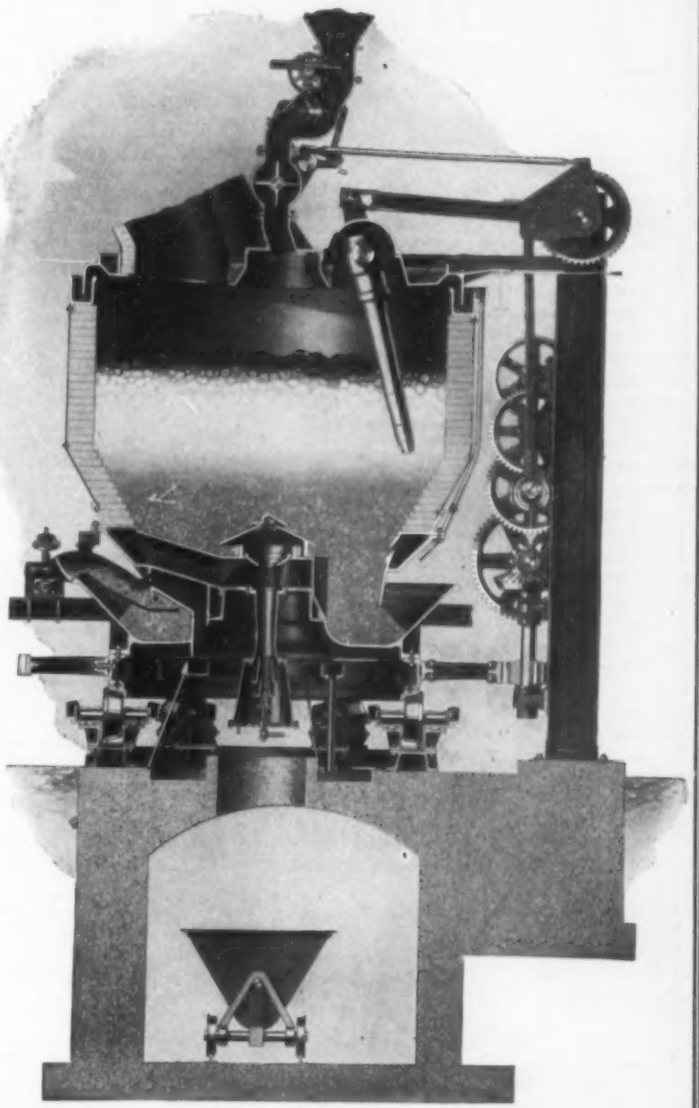
The Hughes Mechanical Gas Producer

REPEAT ORDERS
Indicate Satisfaction

A partial list of repeat customers showing number of Hughes Producers used by each.

Carnegie Steel Co.	119
American Steel & Wire Co.	56
Bethlehem Steel Co.	54
New Jersey Zinc Co.	42
National Tube Co.	41
Jones & Laughlin Steel Co.	40
Lackawanna Steel Co.	39
Indiana Steel Co.	38
Inland Steel Co.	36
Minnesota Steel Co.	36
Pittsburgh Steel Co.	36
American Sheet & Tin Plate Co.	32
Republic Iron and Steel Co.	32
American Rolling Mill Co.	30
Corrigan, McKinney & Co.	30

More than 1000 in use



Write for Bulletin A-4

Bulletin A-4 contains considerable information on the subject of producer gas and explains the Hughes Uniform Feed, Water Cooled Poker, Blowing, Mixing and other special features which contribute to its splendid performance. A copy is waiting your request.

THE WELLMAN-SEAVER-MORGAN CO.

CLEVELAND, OHIO, U. S. A.

public garage and machine shop costing about $12,500.

MILWAUKEE. — The Wisconsin Motor Mfg. Co. is building a 2-story brick and concrete office, drafting room and laboratory addition costing $15,000. A. F. Milbrath is secretary and chief engineer.

MILWAUKEE.—The Wisconsin Shipbuilding & Navigation Co., care Paul E. Thomas, 831 M. & M. Bank building, is planning to build a shipbuilding plant on Kinnickinnic river costing $2,500,000.

MILWAUKEE. — The Lavinge Gear Co., care of H. A. Uihlein, Racine, Wis., is planning to build a plant costing $300,000. Kirshoff & Rose, Majestic building, Milwaukee, are architects.

MILWAUKEE. — The Allen-Bradley Co. will build a 2-story brick and steel shop addition, 50 x 90 feet. Architect A. C. Eschweiler will award contracts at once.

MILWAUKEE.—The Filer Stowell Co. will build a blacksmith shop costing $30,000. Martin Tullgren & Sons, First National Bank building, are architects.

MILWAUKEE. — The Allen Bradley Co., 485 Clinton street, will build a 2-story addition, 50 x 90 feet, at Clinton street and Greenfield avenue.

MILWAUKEE.—The E. & W. Mfg. Co. is enlarging its plant and installing considerable new machinery and equipment.

MILWAUKEE.—The Hercules Steel Castings Co. will build a 1-story foundry, 80 x 300 feet, to cost $100,000.

FOND DU LAC, WIS.—The Boggess Mfg. Co., Second and Macy streets, manufacturer of mop wringers and specialties, will install a galvanizing plant. J. J. Carberry is secretary.

RACINE, WIS.—A 1 and 2-story brick factory addition, 62 x 190 feet, will be erected by the Racine Auto Top Co., at a cost of $15,000, including equipment. Architects Chandler & Park, Racine, are awarding contracts.

RACINE, WIS.—J. I. Case Tractor Co. will build a 1-story machine shop, 144 x 213 feet, to cost $125,000.

STEVENS POINT, WIS. — The Jackson Milling Co., Grand Rapids, Wis., is planning to build a steel and concrete hydroelectric plant to cost $500,000. L. A. Geers, Grand Rapids, is engineers.
architect.

SUPERIOR. — The Enterprise Foundry Co. is contemplating remodeling a building here. An addition will also be built.

TWO RIVERS, WIS.—The Two Rivers Plating Works is building a 1-story steel addition, 60 x 75 feet, to cost $18,000.

WEST ALLIS, WIS.—The Rosenthal Corn Husker Co. is building a foundry and shop addition 30 x 100 feet to replace a recent fire loss.

DETROIT.—The Dodge Bros. Motor Car Co. has bought the plant of the Wilt Engineering Co., which it will dismantle to provide a site for an addition to its plant.

DETROIT.—The Packard Motor Car Co. will erect an 8-story truck and passenger service station in Chicago, at a cost of $800,000.

DETROIT.—The American Twist Drill Co., is equipping its plant for quantity production of forged twist drills.

DETROIT.—The Buhl Malleable Co. is making extensions to its foundry which will cost about $35,000.

DETROIT.—The National Twist Drill Co. plans the erection of a 4-story addition to its factory.

DETROIT.—The Detroit Heater Corp. contemplates erection of a 1-story factory building.

DETROIT.—The J. E. Bolles Iron & Wire Works plans an addition to its factory.

GRAND RAPIDS, MICH.—The Accounting Machine Co. has bought a site here and plans a factory. Contract for the building has been let to the Owen-Ames-Kimball Co. The building is to be 50 x 175 feet.

JACKSON, MICH. — The Walcott Lathe Co. will erect a large addition to its plant. Dean G. Kimball is vice president.

CHICAGO. — The Sanitary District, of Chicago, care John McGillen, 900 South Michigan avenue, will receive bids until June 6 on the Calumet sewage pumping station, 1-story, 80 x 185 feet to cost $400,000, including building, pumping machinery and electrical equipment.

CHICAGO. — The Independent Button & Mfg. Co., 3940 Ravenswood avenue, will build a 3-story factory. A. L. Moon, 1819 Irving Park boulevard, is president.

CHICAGO.—The Riverside Iron Works is contemplating erection of a 1-story foundry, 60 x 75 feet, to cost $20,000. Plans have been completed.

HAMMOND, IND.—The Standard Steel Car Co. has taken out a permit to erect a new shop at a cost of $100,000.

INDIANAPOLIS. — An addition to the plant of the Nordyke & Marmon Co. will be 1-story, 120 x 176 feet, and cost $42,000. The Austin Co., Cleveland, has the contract.

AKRON, O.—The Wellman-Seaver-Morgan Co., Cleveland, has awarded the George A. Fuller Co., Cleveland, the contract for the construction of its $30,000 power house here. The building will be 1-story, 46 x 97 feet.

AKRON, O.—The T. E. McShaffery Co. has been awarded the contract for the storage building to be erected at a cost of $40,000 for the Akron Scrap Iron Co.

CINCINNATI.—Plans for the construction of several additions and improvements are being drawn for the Peerless Foundry Co. by F. D. Chase, 122 South Michigan street, Chicago. The improvements include the construction of a new foundry.

CINCINNATI.—The John B. Morris Foundry Co. has applied for permits to construct two additions to the foundry, at a cost of $6600.

CLEVELAND.—Plans have been completed for the construction of an addition to the plant of the Cleveland Pneumatic Tool Co., to be erected at a cost of $35,000. The addition will be a 1-story basement, 182 x 52 feet, and will be used for a machine shop.

HAMILTON, O.—Plans have been completed for the erection of an office and factory building for the Niles Tool Works. The cost will be about $15,000.

MANSFIELD, O.—Plans are now being drawn for a building for the Hartman & Spreny Co. It will be 3-stories, 20 x 50 feet.

TOLEDO, O.—Bids are to be opened about May 31, for the construction of a municipal powerhouse at Minster, O., at a cost of $50,000. Vance I. Gray, 518 Nashby building, is engineer.

CLARKSBURG, W. VA.—Swift & Co., Chicago, will build a cold storage plant here, to cost $35,000.

FAIRMONT, W. VA.—The Midwest Box Co., this city, let a contract to D. Eshleman & Son, Anderson, Ind., for a box factory, 66 x 409 feet, to cost $25,000.

FAIRMONT, W. VA.—The Fairmont By-Products Corp. proposes to build a plant here in the near future to include 110 by-product coke ovens and cost $5,500,000.

LOGAN, W. VA.—The Guyan Machine Shops will purchase considerable new equipment at once.

PARKERSBURG, W. VA.—The Parkersburg Iron & Steel Co. has arranged to build an addition, 30 x 25 feet, to its power plant, to cost $12,000.

SUTTON, W. VA.—The Sutton Chemical Co. plans the erection of another factory.

Western and Intermountain Territory

BURLINGTON, IOWA. — The Murray Iron Works, C. H. Schroeder, secretary, will build a 3-story addition, 32 x 40 feet, to cost $5000.

ST. JOSEPH, MO.—The Berry Iron & Steel Co. will proceed at once to rebuild its plant, recently burned, and will erect five buildings in place of the two foundries. The main foundry is 50 x 260 feet, with two cranes.

FORT SMITH, ARK. — The Creekmore Motor Co. is contemplating erection of a machine shop and repair plant. It recently added $40,000 to its capitalization.

LITTLE ROCK, ARK. — The Arkansas Battery Co. is contemplating equipping a plant with more than $10,000 worth of machinery. W. P. Galloway is president.

GEARY, OKLA.—The city of Geary plans new waterworks pumping machinery equipment, of 800,000 gallons daily capacity. L. E. Troxel is mayor.

McALESTER, OKLA.—Burns & McDonnell, engineers, Kansas City, Mo., are preparing plans for a waterworks system and sewage treating plant to cost $500,000 to $600,000.

OKLAHOMA CITY, OKLA. — The Federal Steam Specialties Co. has been organized by W. E. Price and F. X. Loeffler and will equip a plant with about $25,000 worth of machinery.

OMAHA, NEBR. — The Omaha Crockery Co. soon will begin the construction of a 5-story addition to its present building. The addition will cost about $75,000.

CLAYTON, N. MEX.—Bonds for $75,000 will be sold shortly to provide funds for building a waterworks system. A. J. Mahon is city clerk.

100

ROLLING MILLS

Of Our Design and Manufacture

79 in the United States of America

5 in Canada	1 in France
5 in England	1 in Belgium
4 in Germany	1 in Austria
3 in India	1 in Australia

AS CONSULTING ENGINEERS

we prepare estimates and make drawings for contemplated rolling mills. Our services include electrical engineering.

AS MANUFACTURING ENGINEERS

we enter into contracts for complete rolling mills, producer-gas machines, and wire drawing equipment.

MORGAN CONTINUOUS ROLLING MILLS—
STANDARD OF THE WORLD

MORGAN CONSTRUCTION CO.

Worcester, Mass., U.S.A.

Say you saw it in THE IRON TRADE REVIEW

New Trade Publications

PENDANT SWITCHES.—A small colored envelope folder, illustrating and describing both single and 2-circuit brass shell and porcelain pendant switches, is being circulated by the Cutler-Hammer Mfg. Co., Milwaukee.

GENERATORS.—Alternating current generators and direct current lighting and power generators, manufactured by the Crocker-Wheeler Co., Ampere, N. J., are described and illustrated in two bulletins just issued. Construction, material and cost of maintenance are fully discussed.

CIRCUIT BREAKERS.—An 8-page booklet on these devices is being circulated by the Roller-Smith Co., New York. The booklet explains the use of the circuit breaker as a protection for an ordinary motor, in the event of overloading. The breaker, the booklet points out, tends to trip instantaneously when the load for which it is adjusted, is applied.

POWER HAMMERS.—The United Hammer Co., Boston, is circulating a bulletin recently printed, containing several illustrations of its types of power hammers. The pamphlet also describes hammers adapted for the manufacture of edge tools, spindles, files, shovels, plows, agricultural implements and other thin work where dies are brought close together.

STOKER.—The Laclede-Christy Clay Products Co., St. Louis, is distributing a 12-page booklet describing a chain grate stoker for high volatile coals, which it manufactures. The booklet thoroughly describes the stoker, telling of its construction, etc. The pamphlet is well illustrated and contains several diagrams showing actual installations of the stoker.

TRUCKS. — Methods of handling factory trucking are described in a catalog on automatic lift trucks issued by the Stuebing Truck Co., Cincinnati. The truck is designed for service in handling loads which have been placed on raised platforms, thus economizing loading and unloading time. The truck is made of steel and is equipped with roller bearings, making it possible for heavy loads to be moved by one man.

INDUSTRIAL HAULAGE. — The Lakewood Engineering Co., Cleveland, has just published a bulletin containing information regarding its equipment for use in handling freight at warehouses and docks, moving machinery about in machine shops and for other haulage purposes in factories. A number of factory electric trucks and tractors, as well as hand trucks are described and illustrated in the booklet.

FIRE BRICK CEMENT.—A circular was recently issued by the Quigley Furnace Specialties Co., New York, containing information on fire brick cement which it manufactures. This is a refractory plastic material and, the circular claims, will retain its strength up to a heat of 3100 degrees Fahr. It is especially designed for use in laying fire brick and tile, for furnace repair work, and other mill and foundry work.

CONVEYOR.—John F. Godfrey, Elkhart, Ind., recently published a circular illustrating and describing a coal conveyor. The conveyor, which is small, can be operated by one man, and is designed to load auto trucks and wagons quickly, as well as to unload cars and stock coal in a short time. The circular contains a number of illustrations, including several diagrams, showing how the conveyor works.

OXYGEN AND HYDROGEN GENERATOR.—The Levin oxygen and hydrogen generator is illustrated and described in a circular recently issued by Electrolabs, 15 William street, New York. This generator is of the unit type and consists of three parts. The oxygen is generated in the two outer and the hydrogen in the center compartment. One of these generators will produce 38.4 cubic feet of oxygen and 76.8 cubic feet of hydrogen in 24 hours.

TOOLS.—A quick reference catalog recently was issued by the Ready Tool Co., Bridgeport, Conn., illustrating and describing tools manufactured by this company. Chrome nickel lathe tools; shaper and planer tools; tool holder for bench and watch lathes; boring tool holders; boring bars and internal threading tools; cutting off tools; side tools; shaper or milling machine vise hold-downs; belt sticks; high speed steel cutters and many other tools are all fully described.

COLD SAWS.—A bulletin has been recently issued by the Earle Gear & Machine Co., Philadelphia, describing and illustrating the use of its cold cutting-off saws. A brief summary of the points of design and operation of the cold saw is given in the forepart of the booklet. The company's cold saws are manufactured in four sizes, a description and illustration of each being given. Several illustrations show the saws in actual service on a wide variety of work.

ADVERTISING. — After three years of preparation, "Advertising", bound in limp leather, by E. H. Kastor of H. W. Kastor & Sons, has just been published by the La Salle Extension university, Chicago. Ideas gained in 20 years experience in the advertising business are set forth in this volume's pages to make it a practical and comprehensive work. Effective copy is effectively handled and illustrations of successful advertisements with explanations as to what makes them successful are given.

HYDRAULIC VALVES AND FITTINGS. —A 60-page booklet containing illustrations and descriptions of hydraulic valves and fittings is being circulated by the Hydraulic Press Mfg. Co., Mt. Gilead, O. Each device is illustrated and briefly described. All standard types of hydraulic fittings are listed as well as accumulator controls, pressure gages, hydraulic pipes, etc. The four general classes of hydraulic valves, operating, check, knockout and safety, are also illustrated and described at length.

TOOL STEEL.—The manufacture and use of tool steel is fully described in a booklet recently published by the Ludlum Steel Co., Watervliet, N. Y. The booklet is original in that the metallurgy of steel is treated in simple language, all technical terms having been eliminated as far as possible. A complete chapter is devoted to nickel, chromium, manganese and tungsten respectively. The effect of heat on alloys of these metals is described. The catalog contains 156 pages and the information given on the manufacture of tool steel is of interest and value.

CHAIN DRIVE.—The Link-Belt Co., Chicago, recently published a catalog on chain drives for machine tools. The chain consists of a series of leaves or plates, the joints of which consist of case-hardened liners or bushings and case-hardened steel pins. The catalog, which is elaborate, contains a number of illustrations showing the chain used in driving a number of different types of machine tools, including gear hobbers, pipe threaders, lathes, automatic machines, gear cutters, roll lathes, grinders, and various other types.

ELEVATORS.—A leaflet has just been issued by the Warner Elevator Mfg. Co., Cincinnati, describing and illustrating the company's line of elevators. The motor used in these elevators has a heavy driving sheave with four grooves for lifting cables. The motor is so designed that it can be changed at any time from alternating to direct current. The elevator is equipped with an electric brake, which is applied by means of a spring. The elevators are designed for freight service and have a capacity of from 2500 to 6000 pounds and a speed of 50 feet per minute,

ELEVATING TRUCKS. — An attractive catalog is being circulated by the Lewis-Shepard Co., Boston, illustrating and describing its trucks for use in industrial plants. The catalog contains many illustrations showing the various uses to which the trucks can be put, and thoroughly describes each type. The trucks range in size from 17 to 27 inches in width. Their maximum capacities range from 2500 pounds with a lift of 2½ inches to 8000 pounds with a lift of 3 inches and one of 3000 pounds capacity with a lift of 6 inches.

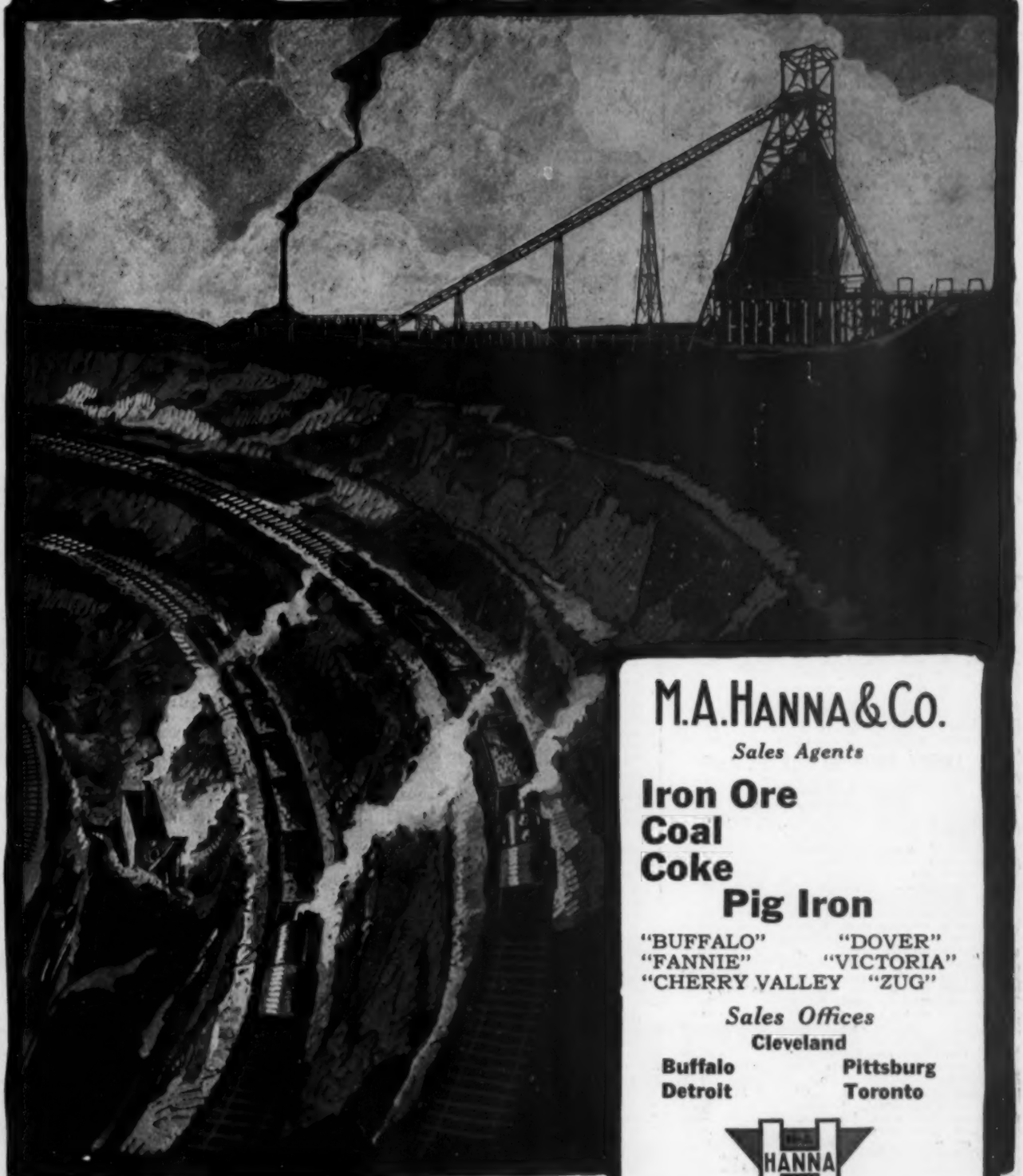
FOUNDRY CONSTRUCTION. — A treatise on the construction and the working system of the modern foundry is being circulated by Frank D. Chase, Inc., industrial engineers, Chicago. The treatise is from a paper read by Mr. Chase recently before the Philadelphia Foundrymen's association. Plant location, site railroad facilities, labor, power facilities, plant construction, the laying out of the different parts of the plant and other important points of modern foundry construction and operation are thoroughly discussed. The treatise is well illustrated.

INVOLUTE GEARS.—A booklet containing a concise treatise on the application of the involute curve to gearing, is being distributed by the Fellows Gear Shaper Co., Springfield, Vt. The subject is discussed in as simple language as possible, making the action of involute gearing plain without the use of higher mathematics.

The booklet points out that with involute gear teeth, the center distance of the gears can be varied without affecting the theoretical tooth action of the gears in mesh. This booklet is in its third edition and has been fully revised.

HAND MAGNET.—A circular is being distributed by the Cutler-Hammer Mfg. Co., Milwaukee, describing a hand magnet, for use in machine shops, foundries, and numerous departments of manufacturing plants. The magnet is made for operation on 110 or 220-volt direct-current circuits. The circuit to the magnetic coils is opened and closed by means of a trigger under the handle. The magnet can be used for clearing chips and borings out of machinery. It can be used to separate brass chips from iron. In foundries the magnet is handy in picking up warm and awkwardly shaped castings. The magnet complete weighs but 8 pounds.

HANNA



M. A. HANNA & CO.

Sales Agents

Iron Ore
Coal
Coke
Pig Iron

"BUFFALO" "DOVER"
"FANNIE" "VICTORIA"
"CHERRY VALLEY "ZUG"

Sales Offices

Cleveland
Buffalo **Pittsburg**
Detroit **Toronto**

HANNA

Say you saw it in THE IRON TRADE REVIEW

Iron and Steel Prices

Corrected to Tuesday Noon

IRON ORE

Superior Ores, Per Ton, Lower Lake Ports	
Old range Bessemer, 55 iron	$5.95
Mesabi Bessemer, 55 iron	5.70
Old range non-Bess., 51½ iron	5.20
Mesabi non-Bess., 51½ iron	5.05

WAREHOUSE PRICES

Steel bars, Chicago	4.10c
Steel bars, Cleveland	4.035c
Steel bars, Detroit	4.085c
Steel bars, Philadelphia	4.10c
Steel bars, New York	4.095c
Steel bars, St. Louis	4.17c
Steel bars, Cincinnati	4.085c
Steel bars, St. Paul	4.22c
Steel bars, Buffalo	4.05c
Iron bars, Buffalo	4.65c
Iron bars, Chicago	4.10c
Iron bars, Cleveland	3.985c
Iron bars, Detroit	4.75c
Iron bars, St. Louis	4.17c
Iron bars, Cincinnati	4.085c
Iron bars, Philadelphia	4.50c
Iron bars, New York	4.659c
Shapes, Chicago	4.20c
Shapes, Detroit	4.185c
Shapes, St. Louis	4.27c
Shapes, St. Paul	4.32c
Shapes, New York	4.195c
Shapes, Cleveland	4.135c
Shapes, Philadelphia	4.20c
Shapes, Buffalo	4.15c
Shapes, Cincinnati	4.185c
Plates, Buffalo	4.40c
Plates, Chicago	4.45c
Plates, Detroit	4.435c
Plates, St. Louis	4.52c
Plates, St. Paul	4.57c
Plates, New York	4.445c
Plates, Cleveland	4.385c
Plates, Philadelphia	4.45c
Plates, Cincinnati	4.435c
No. 10 blue anl. sheets, Chi.	5.45c
No. 10 blue anl. sheets, Cleve.	5.385c
No. 10 blue anl., Buffalo	5.40c
No. 10 blue anl., sheets, St. L.	5.52c
No. 10 blue anl. sheets, Cinci.	5.435c
No. 10 blue anl. sheets, St. Paul	5.57c
No. 10 blue anl. sh., Detroit	5.435c
No. 28 black sheets, Chgo.	6.45c
No. 28 black sheets, Cleve.	6.385c
No. 28 black sheets, Cinci.	5.45c
No. 28 black, Detroit	6.435c
No. 28 black sheets, St. L.	6.52c
No. 28 black sheets, St. Paul	6.57c
No. 28 galv. sheets, Chgo.	7.70c
No. 28 galv. sheets, Cleve.	7.635c
No. 28 galv. sheets, Cinci.	6.635c
No. 28 galvanized, Detroit	7.685c
No. 28 galv. sheets, St. L.	7.77c
Hoops, Cleveland	4.885c
Hoops, Detroit	4.935c

IRON AND STEEL SCRAP

(Prices in Gross Tons)

STEEL WORKS USE

Bundled sheets, Cincinnati	$22.50 to 23.00
Bundled sheets, Pittsburgh	22.00
Bundled sheets, Cleveland	23.50 to 24.25
Bundled sheets, Buffalo	24.00 to 25.00
Boiler plate, cut, No. 1, Chg.	24.50 to 25.50
Boiler plate, cut No. 1, St. L.	25.50 to 26.00
Frogs, switches, guards, St. L.	28.50 to 29.00
Frogs, switches, guards, Chgo.	29.00
Heavy melting steel, Pitts.	29.00
Heavy melting steel, Buffalo	30.00
Heavy melting steel, Chgo.	29.00
Heavy melt'g steel, Cleveland	29.00
Heavy melting steel, Cinci.	27.50 to 28.00
Heavy melt'g steel, east. Pa.	28.00 to 29.00
Heavy melting steel, N. Y.	26.75
Heavy melting steel, St. L.	27.50 to 28.00
Heavy melt'g steel, Birming.	22.50 to 24.00
Hydraulic press. sheets, Cleve.	28.50 to 29.00
Hydraulic press. sheets, Pitts.	26.00
Hydraulic press. sheets, Chgo.	26.00 to 26.50
Knuckles, couplers, Chgo.	34.00
Knuckles, coup., St. Louis	32.50 to 33.00
Low phos. steel, Buffalo	37.50
Low phos. steel, Pittsburgh	39.00
Low phos. crops eastern Pa.	39.00
Low phos. quar. & east. Pa.	36.50
Shoveling steel, Chicago	28.00 to 28.50
Shoveling steel, St. Louis	26.50 to 27.00
Springs, Chgo.	34.00
Steel rails, short, Chicago	34.00
Steel rails, short, Cleveland	34.00
Steel rails, short, St. Louis	30.75 to 31.25
Steel rails, old, Birmingham	24.00 to 25.00
Stove plate, Chgo.	25.50 to 26.50
Stove plate, Cincinnati	20.50 to 21.00
Stove plate, St. Louis	22.50 to 23.00
Stove plate, N. J. points	24.75
Stove plate, Birmingham	20.00 to 22.00
Stove plate, Buffalo	24.00 to 25.00
Stove plate, eastern Pa.	24.00 to 25.00
Stove plate, Cleveland	25.00 to 25.50
Stove plate, Pittsburgh	22.00
Bundled sheets, Cincinnati	22.50 to 23.00

Freight Rates, Pig Iron

Mahoning and Shenango valleys to:	
Cleveland	$1.10
Newark, N. J.	3.50
Boston	3.70
Philadelphia	3.30
Pittsburgh	1.10
St. Louis	3.70
Minneapolis, St. Paul	4.54
Buffalo to:	
Albany, N. Y.	$1.26
New England (rail)	3.10
New York and Brooklyn (rail)	3.10
Virginia furnaces to:	
Philadelphia	$3.27
New England	3.77
Brooklyn, Jersey City, Newark	3.52
Birmingham, Ala., to:	
Boston	6.00
Cincinnati	2.90
Chicago	4.00
Cleveland	4.00
Louisville, Ky.	2.65
Minneapolis, St. Paul	5.85
New York (r. and w.)	6.00
Philadelphia (r. and w.)	5.25
Pittsburgh	4.90
Savannah, Ga.	2.75
St. Louis	3.40
Chicago to:	
Des Moines	$2.80
Minneapolis, St. Paul	2.00
Milwaukee	.50
Moline, Ill.	1.15
Omaha	3.58
St. Louis	1.58
Ironton and Jackson, O., to:	
Chicago	$3.00
Cincinnati	1.40
Cleveland	1.90
Detroit	2.10
Indianapolis	1.80
Minneapolis, St. Paul	4.54
Duluth, Minn., to:	
Minneapolis, St. Paul	$1.25
Mayville, Wis.:	
Minneapolis-St. Paul	$1.75

Freight Rates, Finished Material

Pittsburgh, carloads, per 100 lbs., to:	
New York	19.5 cents
Philadelphia	18.5 cents
Boston	21.5 cents
Buffalo	17.0 cents
Baltimore	18.0 cents
Cleveland	13.5 cents
Cincinnati	18.5 cents
Chicago	21.5 cents
Detroit	18.5 cents
Minneapolis and St. Paul	32.9 cents
Denver	82.5 cents
St. Louis	27.0 cents
New Orleans	30.7 cents
Birmingham	45.0 cents
Pacific coast (all rail)	$1.00
Pacific coast (tin plate)	1.00

IRON MILL USE

Angle bars, iron, Chgo.	39.00
Angle bars, steel, St. Louis	30.50 to 30.50
Angle splice bars, St. Louis (iron)	37.50 to 38.00
Arch bars, transoms, Chgo.	43.00 to 44.00
Arch bars and transoms, St. Louis	45.00 to 45.50
Busheling, No. 1, Cleveland	29.00 to 30.00
Busheling, No. 1, Buffalo	29.00 to 30.00
Busheling, No. 2, Buffalo	21.00 to 23.00
Busheling, No. 1, Pittsburgh	32.00
Busheling, No. 1, Cincinnati	25.00 to 25.50
Busheling, No. 1, Chgo.	28.75 to 29.25
Busheling, No. 2, Chgo.	19.00 to 20.00
Busheling, No. 1, St. Louis	27.00 to 27.50
Cast borings, New York	16.50 to 17.00
Cast borings, eastern Pa.	19.00
Cast borings, Buffalo	18.00 to 19.00
Cast borings, Cleveland	18.00
Cast borings, Cincinnati	15.50 to 16.00
Cast borings, Pittsburgh	19.00
Cast borings, Birmingham	12.00 to 12.50
Cast borings, Chgo.	17.50 to 18.00
Cast borings, St. Louis	16.50 to 17.00
City wrought, long, N. Y.	31.00
Cut forge, Chgo.	31.00 to 31.50
Forge flashings, small, Cleve.	27.00 to 27.50
Forge flashings, large, Cleve.	27.00 to 27.50
Forge No. 1, eastern Pa.	26.50 to 27.50
Grate bars, Buffalo	24.50 to 25.00
Grate bars, Cleveland	25.50 to 26.00
Grate bars, N. J. points	24.75
Iron axles, Pittsburgh	46.50
Iron axles, Cincinnati	43.50 to 44.00
Iron axles, Cleveland	46.50
Iron axles, Chicago	46.50
Iron axles, eastern Pa.	46.50
Iron axles, St. Louis	46.00 to 46.50
Iron axles, Buffalo	45.00 to 47.00
Iron rails, Chicago	39.00
Iron rails, Buffalo	36.00 to 37.00
Iron rails, Cincinnati	34.00 to 35.00
Iron rails, St. Louis	36.00 to 36.50
Iron rails, Cleveland	34.00
Machine turnings, Cincinnati	16.00 to 16.50
Machine turnings, Cleve.	18.00 to 18.25
Machine turnings, Buffalo	17.00 to 17.50
Machine turnings, N. Y.	16.00 to 16.50
Machine turnings, Pitts.	18.00 to 19.00
Machine turnings, east. Pa.	18.50 to 19.00
Machine turnings, Birming.	17.00 to 17.50
Machine turnings, Chicago	17.50 to 18.00
Machine shop turnings, St. L.	17.50 to 18.00
Pipes and flues, Cleveland	24.50 to 25.50
Pipes and flues, Chicago	26.50 to 27.00
Pipes and flues, St. Louis	26.25 to 26.75
R. R. mch. cast, No. 1, Buff.	34.00
R. R. wrgt. No. 1, Buffalo	34.00
R. R. wrgt., No. 1, east Pa.	34.00
Railroad wrgt. No. 1 Cinci.	33.50 to 34.00
Railroad wrgt., No. 1, Cleve.	34.00
R. R. wrought, No. 1, Pitts.	34.00
Railroad wrgt., No. 2, Chgo.	30.50 to 31.00
Railroad wrgt., No. 1, Chgo.	33.50 to 34.00
R. R. wrgt. No. 1, Birming.	25.00 to 27.00
No. 1 yard wrought East Pa.	33.00
No. 1 busheling wrgt., E. Pa.	31.00
Sheet wrought, Pittsburgh	34.00
Railroad wrgt., No. 1, St. L.	33.00 to 35.50
Railroad wrgt., No. 2	31.25 to 31.75
Wrought pipe, Buffalo	27.00 to 28.00
Wrought pipe, eastern Pa.	31.50 to 32.00
Wrought pipe, ungraded, eastern Pa.	29.00

IRON OR STEEL WORKS USE

Axle turnings, Cleveland	$24.00
Axle turnings, Buffalo	24.00
Heavy axle turn'gs, E. Pa.	24.00
Heavy axle turnings, Pitts.	25.00
Shafting, New York	35.50
Shafting, eastern Pa.	39.00
Steel car axles, Pittsburgh	46.50
Steel car axles, Birmingham	30.00 to 32.00
Steel car axles, New York	43.00
Steel car axles, Buffalo	44.00 to 46.00
Steel car axles, Cleveland	44.00
Steel car axles, eastern Pa.	46.50
Steel car axles, Chgo.	46.50
Shafting, St. Louis	36.50 to 37.00
Steel car axles, St. Louis	46.00 to 46.50

IRON FOUNDRY USE

Car wheels, (iron), Pitts.	$29.00
Car wheels, (steel), Pitts.	34.00 to 35.00
Car wheels, eastern Pa.	29.00
Car wheels, Buffalo	29.00
Car wheels, Chicago	29.00
Car wheels, St. Louis	28.50 to 29.00
Car wheels, Birmingham	25.00 to 27.00
Car wheels, Cleveland	30.00
Tram car wheels, Birming.	21.50 to 24.00
Cast, No. 1, cupola east. Pa.	33.00
Cast, No. 1, Birmingham	23.00 to 25.00
Cast, No. 1, Cleveland	31.50
Cast, No. 1, Cincinnati	31.50 to 32.00
Cast, 1, heavy, N. J. points	32.25 to 32.75
Cast, 1, machy., N. J. points	32.50 to 32.75
Cast, No. 1, Chicago	30.50 to 31.00
Cast, No. 1, Pittsburgh	32.50 to 33.00
Cast, No. 1, St. Louis	26.50 to 29.00
Malleable, Cincinnati	30.00 to 34.00
Malleable, Cleveland	30.00 to 34.00
Malleable, Buffalo	29.00 to 34.00
Malleable, Pittsburgh	33.00 to 34.00
Malleable, east. Pa.	29.00
Malleable, cupola, East Pa.	33.00
Malleable railroad, Chgo.	32.00 to 33.00
Malleable, agricultural, Chgo.	31.00 to 31.50
Malleable railroad, St. Louis	28.50 to 29.00
Malleable agricultural, St. L.	27.25 to 27.75

MISCELLANEOUS USES

Boiler punchings, Chgo.	36.00 to 36.50
Reroll. rails, 5 ft. & ov., Pitts.	34.00
Reroll. rails, 5 ft. & ov., Chgo.	34.00
Reroll. rails, 5 ft. & ov., E. Pa.	34.00
Reroll. rails, 5 ft. & ov., St. L.	33.50 to 34.00
Reroll. rails, 5 ft. or over, Cleve.	34.00
Rerolling rails, long, Birm.	37.50 to 38.50
Locomotive tires, Chgo.	40.00 to 41.00
Locomotive tires, St. Louis	40.50 to 41.00